Gas Journal

OCTOBER 10, 1934

Vol. 208. 86th Year No. 3725

Editorial Notes

The British Gas Federation

THE news which we are able to publish to-day of the formation of a British Gas Federation will give rise to more interest, and possibly speculation, than any move which has been announced for some time. Although the full extent of the Federation's activities at present disclosed amounts to the arrangement of a banquet, the potentialities for the good of the Industry are obvious. In any case we should not cavil at even an annual banquet if, quite apart from its publicity value which should not be negligible, it was a joint effort of the four national organizations which represent the various activities of the Gas Industry. We might perhaps be forgiven for suggesting that it does not require anything quite so august as a " British Gas Federation " to run even a super banquet in the name of the Gas Industry. We prefer, however, to assume that, having once organized the festive board, they will continue to meet, with sterner business in view, when the festivities are concluded.

The whole Gas Industry, in common with ourselves, will welcome this initial effort at gathering together all the elements which go to make up that great Industry. It has the greatest potentialities for constituting a clearing house which can discuss many of the problems which are agitating us all, and it has the really magnificent start of being committed to—a banquet. And we say this in all seriousness, because all those who find themselves able to attend will do so with entirely open minds. Nobody need absent himself from the inaugural ceremony of the B.G.F. thinking that it is already committed to any line of policy. On the other hand, those who have lines of policy to advocate will see in it possibilities of advancing the ideas which they think will benefit the Industry.

At this we propose to leave the matter for the present. It would be easy enough to suggest lines upon which development of the B.G.F. might proceed, but we cannot conceive of any which will not be brought forward by one or other of the constituents of so very representative a body. We feel convinced of the welcome which will be given to the young Federation on Nov. 5, and we realize its immense possibilities. The welcome will extend to solid support by the whole Industry if prospects of action are evident. And action must be intended, as we do not believe for one moment that the Governing Bodies of the existing national organizations who are forming the Federation visualize that any extensive " furthering of the interests and welfare of the Gas Industry " can be achieved solely by holding an annual banquet or by founding a new talking machine.

Methods of Charge

IT was unfortunate that the time-table of the meeting of the North of England Association precluded discussion of Mr. Duxbury's Presidential Address. We feel sure that, had time allowed, a valuable discussion would have taken place, for the address touches upon many problems of policy affecting our Industry's progress—such questions as methods of charge, hire purchase and simple hire, the advisability or otherwise of scrapping black cookers, " free " service, and the lighting load. It is apparent that Mr. Duxbury is fully alive to the needs of the hour and has a broad conception of what constitutes modern gas service in face of modern competition.

In regard to methods of charge, there is a belated awakening to the futility of a flat-rate price as a business-getter, and many undertakings now are following the example—with suitable modification according to local circumstances—set by those who showed early enterprise and have reaped their reward. We have been able to publish lately information of several types of attractive tariff systems which encourage the greater use of gas. Even so, the development is not proceeding as fast as it should. Some undertakings appear to be waiting for a strong lead from the National Gas Council, but it has to be remembered that a scheme which might suit one undertaking might be wholly wrong for another undertaking working under quite different conditions. We have pointed out on several occasions in these columns that rate-making does not call for dogmatism; but it is essential that greater attention should be paid to the matter, and there is no doubt that many undertakings would welcome a greater measure of expert advice. We doubt whether any system of charging could be devised which could be universally applied with uniform success. At the same time, we look for authoritative recommendations to guide the many undertakings now considering the question, in order that the number of methods in use should not be unduly increased.

In this respect Mr. Duxbury agrees with us, and regrets that the question of gas charges generally " has not been dealt with sooner, in a national way," believing that a " general basis " could have been laid down. We do not quite follow what the author means by a " general basis," and his ideas on this point would be interesting. But, as a general principle, we have urged for long that whenever it becomes possible to reduce the price of gas, the reduction should be applied to a form of tariff more attractive than the old flat-rate charge. And in regard to the block system of charge we maintain that quick and

substantial relief after the first block is necessary. One can hardly expect to obtain business by giving minute concessions in the early part of a block scale. Mr. Duxbury has made a start with a block scale, and the reduction on the second block is the good one of 9d. per 1,000 c.ft. The first block, however, is far too great—as, indeed, the author realizes. Before the consumer gets any relief he has to use 20,000 c.ft. per quarter—a figure which becomes more impressive when translated into a minimum consumption of 80,000 c.ft. a year, or a minimum annual bill of £16. Mr. Duxbury is aiming at a first block of 5,000 c.ft., and we have little doubt that with a block of this size business would increase in volume by leaps and bounds. In the meantime, Mr. Duxbury has to face cold economic facts; but he has started on the right road, and he is sure that the revised charges—in spite of the large first block—have been of much greater advantage to his Company than would have been the case if the reduction had been made on a gradual scale.

Hire and Hire-Purchase

THE question of hire or hire-purchase is admittedly complex. We agree with Mr. Duxbury that hire-purchase has the great advantage that the consumer has more interest in his appliance and feels that he is capitalizing his savings. But we would not go so far as to advise the abandonment of simple hire. In many areas of supply there is a large "floating" population, and these would-be consumers of gas are naturally reluctant to enter into an agreement for the hire-purchase of a gas cooker—over whatever period of years the agreement extends. And if in these circumstances the gas undertaking has no scheme of simple hire, the electrical salesman with his simple hire high-class cookers at exceedingly low rentals and fixed free will not find his task very difficult. The situation, forced upon us by competition, is unpleasant, but clear, and must be faced if we are to retain and extend our cooking load. We must be prepared to expend capital on which there will be no immediate return. By all means let us press for the hire-purchase of enamelled cookers complete with oven heat control. On the other hand, we suggest that wholesale abandonment of simple hire would be unwise. Also, simple hire should be extended to include attractive enamelled cookers, for the comparison in appearance between the old black cooker and its modern electrical counterpart is not exactly in favour of the Gas Industry.

Lately we have had examples of the success which has attended certain undertakings which have adopted the policy of hire-purchase only. A notable instance was recounted by Mr. G. P. Mitchell in his Presidential Address to the Waverley Association, published in the "JOURNAL" for July 9 last. Mr. Mitchell (now of Worcester) abandoned simple hire at Blackburn as long ago as 1920, and the results of his plan, as set out in the "JOURNAL," speak for themselves. But we have to face the fact that obsolete apparatus must be removed from the district, and it is open to question whether those who ceased simple hire, say, ten years ago are in a better position as regards replacement of black cookers. As we said in the "JOURNAL" for July 9, "admittedly they, as gas undertakings, do not actually own obsolete cookers on the district, but their consumers do, which is perhaps worse." Mr. Duxbury maintains that the offering of cookers on hire-purchase needs reconsideration. Terms of hire-purchase will, he thinks, have to be extended to give payments approaching those which can be obtained by simple hire. A five-year period may have to be lengthened to as much as ten years. As a matter of fact, Mr. Mitchell offered such terms in 1920 to prepayment as well as ordinary consumers, with excellent results.

The Prepayment Consumer

THE comments of Mr. Duxbury in regard to the prepayment consumer raise an important point. Discussing the black cooker question, he says: "It must be remembered that slot cookers do not receive the same treatment as hire-purchase cookers, and the cost of renovating a badly used enamel cooker is very considerable, and it is almost impossible to do this to make as good a job as can be made with the renovating of a black cooker. For this reason at least one large undertaking, after much experience, has given up putting enamel cookers out for slot installations and has reverted to black ones with white door panels." The trend of the Gas Industry must also be borne in mind, however. In 1920 the prepayment consumers outnumbered the ordinary consumers by just over half a million; in 1933 they exceeded the ordinary consumers by more than two millions. Out of a total of 10,012,379 consumers, 6,017,383 are supplied through prepayment meters. We cannot afford to differentiate as markedly as in the past between ordinary and prepayment consumers. In our opinion there should be as little price and service distinction as possible between the gas supplied to ordinary and prepayment consumers; we should do all economically possible to enable the prepayment consumer to enjoy the facilities of the ordinary consumer. It should not be difficult, for example, to offer to the prepayment consumer different classes of cooker at varying rates, on either long-term hire-purchase, or simple hire.

Enterprise at South Bank

THE ideal business-getter is, of course, cheap gas *plus* good service. At whatever price gas is sold it must be accompanied by the necessary organization to ensure that it is used to the satisfaction of the consumer. Such an organization costs money, but is essential. The service schemes of undertakings differ widely, and "free" service is an elastic term. At South Bank "free" service includes more than most undertakings would care to contemplate—pendants to replace existing old ones, boiling burners, flexible tubing, fire radiants, carcassing of houses, batteries for catalytic switches, and general maintenance work. A tall order; but Mr. Duxbury is certain that it pays him handsomely. At any rate, this attention to service, we suggest, has been largely responsible for the extent of his lighting load. In regard to domestic lighting, Mr. Duxbury has fixed 8,930 burners during the past five years, which is good going when it is considered that his consumers total only a little more than 7,000; and we are glad to note what good progress is being made with switch control. Of particular interest is the description of an installation of shop lighting so satisfactory that it has been instrumental in securing gas lighting in a number of other shops, much of this replacing existing electric lighting. The installation described and illustrated is a model of its kind, neat switchboard control emphasizing that there is nothing out of date about gas lighting. Mr. Duxbury's stress on the importance of the lighting load is backed up by results which should hearten others to tackle this phase of the Gas Industry's service with greater enthusiasm.

"Breakdown"

Such was the title of the leading article in the *Evening Standard* last Thursday. Having referred to the failure of electricity in a large area of South London on two successive evenings, Oct. 2 and 3, the article went on to say: "The frequency and magnitude of electrical breakdowns have become disturbing. One evening in January there was serious interruption of the supply to areas in the West and North-West of London. One evening in February occurred a stoppage which affected districts in the South-West. A failure in July dislocated train and tram services over an area of some 12,000 square miles in South-East England. Last month a breakdown cut off the supply to Canterbury and Herne Bay."

The explanation given by an official of the County of London Electric Supply Company of the failure on Oct. 3 is that a transformer was put out of action by the wet weather. The transformer, of course, is essential to the functioning of the grid; and the *Evening Standard's* comment is very much to the point: "It is an unpleasant thought that a transformer serving a great area of London can be incapacitated by wet weather. The public will wonder how many of the thousands of transformers in the grid system are likewise at the mercy of our climate. . . . The seriousness of electric current breakdowns is not limited to the inconvenience they cause to the householder. They often mean lost revenue to the trader, lost time in the factory, danger of life in the streets through the failure of lamps and traffic signals."

It is not often that the Press treats the darling electricity so roughly; but it is about time that the public were awakened from a state of electrical hypnosis. The grid cannot be acclaimed a success if every now and then extensive areas throughout the country are shut off from a supply of electricity. The *Evening Standard's* grievance is concerned with the London area, but breakdowns are by no means confined to the Metropolis. In our news pages we reprint an extract from *To-Day's Cinema*, from which it will be seen with what concern cinema proprietors in the North-West of England view the failure of the grid. They realize in such breakdowns "a possible calamity," and are thankful that as yet there has been no panic in the theatres. While not wishing to go to the trouble and expense of installing private generating plants, the cinema proprietors throughout a large area of England see no other alternative if their business is to be interrupted in this way. No wonder they feel there "is something not quite right" with the grid.

Attracting Business

The Stretford and District Gas Board has formulated a most attractive optional two-part tariff applicable to both ordinary and prepayment consumers. We regard the scheme as a first-class business getter which is likely to be warmly welcomed by gas consumers in the Stretford area. Under this new tariff the ordinary consumer pays a demand charge—termed a "gas service rental"—of 10s. per quarter, and thereafter is supplied with gas at the commodity charge of 3½d. a therm. At such a low cost he has every incentive to extend his uses of gas in directions he most likely would never contemplate at the standard flat-rate charge of 9½d. per therm. He can, in fact, enjoy all the cleanliness and convenience of gas for heating and water heating without increasing his total fuel bill—which gives the salesman a very pretty argument.

The "gas service rental" for the prepayment consumer is fixed at 24s. a year. As with the ordinary consumer, it is payable in advance, but in eight instalments of 3s. each. Gas is then supplied at 5d. a therm. There is also a most interesting alternative method of collecting the service charge from prepayment consumers. For those consumers who desire to pay the charge by instalments of 6d. a week (four payments per calendar month) the Board provides an indicating money box which shows the date up to which payments of gas rental have been made.

The new tariff is certainly a most enterprising one, and we have no doubt that it will bring the success which such enterprise merits.

Free State Electricity

Quarterly accounts have been always with us, and during late years the system of rendering bills monthly has become more and more familiar, but now it seems that Southern Ireland has struck out a line of its own, by instituting a two-monthly system of sending out accounts for electricity, so spreading the work of preparation evenly throughout the year. This is an improvement upon quarter-day applications, while at the same time it involves less work than when the accounting is on a monthly basis. In addition to even spreading of the labour, we are told that bad debts have been reduced to a minimum. This information is contained in an article by a special correspondent of the *Financial Times*, who refers to another advantage which presumably is associated with the two-monthly account system. "In one important respect," he says, "the Electricity Supply Board is unique among creditors in the Free State. Its accounts are met with a punctuality that is unknown in other businesses."

The article forecasts the results of the Board's operations for the past financial year, which will be published shortly, An important aspect of these results is that, while a steady increase has been experienced in the total number of units generated in the various stations controlled by the Irish Free State Electricity Board during 1933-34, this increase, and very much more besides, has been at the expense of the greatly advertised Shannon scheme, and to the benefit of the Board's fuel power stations. A table of the units generated by the Board during the past three years shows that the Ardnacrusha (Shannon) water power station produced in 1931-32 151 million, in 1932-33 143 million, and in 1933-34 103 million units. For the same three years the fuel stations produced respectively less than 1 million, 22½ million, and 82 million units. In effect, while the total increase in the units generated during the past financial year, as compared with the twelve months immediately preceding, is about 20 million, the increase in the production of the fuel power stations is close upon 60 millions, which represents a falling off of 40 million units for the water power station.

The writer of the article admits that considerable apprehension has been occasioned in some quarters by this result, while in other quarters the position does not cause concern. Drought has, no doubt, seriously interfered with the working of the Shannon station, but this is a contingency which must be taken into account in connection with any river power scheme. Seemingly steps are being taken which will tend to make the Ardnacrusha works less dependent upon the seasons, but this, again, will necessarily involve considerable expenditure. There are varying factors that will have a bearing upon the capital cost of schemes of this character, but continuity of flow must be one of the most important. It must be assumed that, with the experience of the Shannon scheme before them, this factor has been taken full

account of in investigations which have been proceeding as to the practicability of harnessing the Liffey for the purpose of supplying electrical energy. The writer says the belief is that the experts who have been engaged in this investigation are favourably disposed to the development of a hydro-electric station upon the Liffey, in which case the conditions must be different from those which prevail with the Shannon, inasmuch as he thinks " it is probable that in the future less dependence will be placed upon the Ardnacrusha station."

The Ubiquitous Press

NOT long ago we were writing in these columns about the good publicity which can be obtained if the Press is treated as it expects to be treated. An amazing instance has come to our notice of the harm which the Press can do us, even quite innocently, as we believe it would have been in the present case if harm had come.

A piece of household china was bought in London by a good lady who, as luck would have it, was intimately connected with the Gas Industry. As she threw away an old piece of newspaper stuffed in her purchase, the words " Gas Cookers " in a headline halfway down a column of print caught her eye. " Arising out of a report of the Gas Committee," she read, " that only six new gas cookers had been sold during the last quarter, Councillor —— mentioned the case of a man, who, although he ordered a cooker six months ago, had not yet received it. He was wondering, in view of this, whether they were doing all that was possible to push the sale of gas. It seemed to him that someone was guilty of neglect. The Chairman of the Gas Committee promised that the complaint would be fully investigated at the next meeting of the Committee."

The news sheet bore a recent date in 1934, and the town in question is situated in Yorkshire. A glance at the statistics in the " JOURNAL " Calendar and Directory shows it to be an undertaking of over four thousand consumers, and it seems incredible that this can be a genuine example of gas sales and service in the year 1934. But whatever the reason, here was this imp of mischief carrying its report from the small Yorkshire town to the Capital, a piece of corroborative evidence to the purchaser of the teapot—and her friends—if she had been a waverer, and had received a recent whisper from an electrical salesman that the Gas Industry is decadent.

All of which confirms our repeated contention that in any case a mismanaged gas undertaking is one too many for the good of the Industry as a whole. It also prompts us to ask whether, even in the ordinary course of events, we compare favourably with other trading concerns as regards speed of delivery and fixing. The loss of gas consumption when delay occurs is a serious matter, but still more vital is the goodwill effect of quick delivery, and the fact that it obviates possibility of change of mind.

Better Public Lighting

" AN analysis of the incidence of street accidents shows that the peak time, during which most accidents occur, falls between dusk and midnight—the hours of artificial lighting. Only the most efficient and reliable lighting can solve the problem of the roads. Uneven light, glare, or sudden failure might spell avoidable disaster." The foregoing is quoted from the latest publication of the British Commercial Gas Association addressed " To every public man.". This booklet, which is illustrated by examples of street lighting installations by gas in important centres throughout the country, sets out to emphasize that the safety of citizens on the roads—motorists and pedestrians alike—is the responsibility of the Local Authority which decides on the lighting system for its streets. The Committee which makes this decision must think, not in terms of gas or electricity, but in terms of LIGHT. On behalf of the community they are buying light in the form of illumination, and in the name of public safety they will ask for the best illumination that can be had, at the lowest charge on the rates.

The inherent advantages of gas for public lighting are, of course, well known in the Industry; but this booklet fulfils a very valuable purpose in setting forth simply and concisely—yet very convincingly—the merits of this system of street illumination in a manner which must make a strong appeal to those who are responsible for deciding upon the choice of illuminants. The points in favour of gas for street lighting purposes are indicated by reference to reliability, maintenance of quality, visibility, distribution of light, ease of control, and, finally, a word on the important subject of costs. If we may perhaps offer criticism, it is on the score of insufficient emphasis being laid upon the first-named of the above advantages—namely, reliability in comparison with electricity. For all too brief a reference is made in passing to the " black-outs " which jeopardize life and property in times of fog, storm, frost, and floods, on Bank holidays, on heavy shopping days, and even on Christmas Eve, to quote but a few recent examples which are called to mind. Greater stress might well be laid upon the fact that gas is the most dependable light that science has discovered, and that in the City of London—one of the first to use gas—there has never been a breakdown of gas lighting, even for five minutes.

However, the facts set out so admirably in this booklet should be of material assistance to the Industry in retaining and increasing its public lighting load; for it is pointed out that the idea of the adoption of electricity as a sign of enterprise or " up-to-dateness " is completely mistaken, and the proof of this lies in the fact that many of the best-known streets in this country (and, indeed, many other countries) are, after considerable investigation and comparison by bodies who should hold no brief for any specific method of illumination, lighted by means of gas.

Forthcoming Engagements

October

17.—SIR ARTHUR DUCKHAM MEMORIAL FUND.—Meeting of Executive Committee at 28, Grosvenor Gardens, S.W. 1, 3 p.m.

17.—B.C.G.A.—Executive Committee, in the Board Room, 28, Grosvenor Gardens, S.W. 1, at 12 noon.

18.—MIDLAND JUNIOR GAS ASSOCIATION.—Visit to the Works of the Sutherland Meter Company, Ltd., Witton, Birmingham.

19.—SOUTHERN ASSOCIATION (WESTERN DISTRICT).—Commercial Meeting, Rougemont Hotel, Exeter, 2.45 p.m.

19.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Opening Meeting and Presidential Address of Mr. F. C. Smith.

20.—YORKSHIRE JUNIOR ASSOCIATION.—Annual General Meeting at Leeds. Address by R. Halkett, of Sheffield.

24.—COKE SALESMEN'S CIRCLE. — Meeting at 28, Grosvenor Gardens, S.W. 1, at 2.30 p.m. Paper by Mr. E. W. L. Nicol.

25.—COKE OVEN MANAGERS' ASSOCIATION.—Annual General Meeting and Dinner at the Hotel Victoria, London.

25.—EASTERN COUNTIES ASSOCIATION.—Autumn Meeting at 28, Grosvenor Gardens, S.W. 1.

26.—B.C.G.A.—Scottish Conference at Dundee.

26.—MANCHESTER DISTRICT ASSOCIATION. — General Meeting at Midland Hotel, Manchester.

The British Gas Federation

The governing bodies of the Institution of Gas Engineers, the National Gas Council of Great Britain and Ireland, the British Commercial Gas Association, and the Society of British Gas Industries have formed, without alteration of their respective Constitutions and work, the British Gas Federation, with the object of furthering the interests and welfare of the Gas Industry. The Right Honourable Lord Macmillan has kindly accepted the office of President.

The Inaugural Dinner of the British Gas Federation will be held at Grosvenor House, Park Lane, London, W. 1, on Monday, Nov. 5, 1934, at 7 p.m. Lord Macmillan will be supported by a distinguished company.

Communications on the matter should be addressed to Mr. J. R. W. Alexander, Secretary, Dinner Committee, the British Gas Federation, 8, Grosvenor Gardens, London, S.W. 1.

An Official Report of the Inaugural Dinner will be made by the "GAS JOURNAL," and will be published in our issue of Nov. 7.

Correspondence

Gas Grouping

SIR,—I wish to endorse the view expressed in a Leading Article in your issue of Oct. 3—viz., that open discussion is what the above matter requires more than anything else in order to clear the atmosphere which at present surrounds it.

The present movement towards grouping in the Gas Industry has been the subject of comment both at recent conferences and in the technical and general Press. Some of this comment shows signs of loose thinking and of misconception as to the facts and the risks.

Your article concludes with the constructive proposal that some form of debate should be arranged at which the merits and demerits of grouping could be freely and openly discussed with particular reference to the recent trend of control by newcomers to the Industry. It seems to me that such a step would be of the greatest value and interest to all concerned with the Industry. It would crystallize the position, and would have the further merit of enabling those concerned with the present grouping activities to ascertain, and perhaps to meet, the real objections which lie behind the recent rather nebulous criticism.

As one having a long association with the Gas Industry and at the same time interested in the new movement towards grouping, I should be glad to accept your suggestion and to meet others interested in this movement, either supporters or critics.

No doubt some of the latter will also accept your invitation and state their views. If so, I can undertake that when the proposed discussion takes place, it would be attended by some of those in the forefront of the present grouping activities.

The time and place and form of the discussion could be settled as soon as the critics have indicated their intention to support the suggestion. Perhaps a formal debate would meet the case. The proceedings could be published as a whole or in part, as the interested parties may decide.

Yours, &c.,
GEO. EVETTS.

159, *Palace Chambers,*
Bridge Street, Westminster, S.W. 1,
Oct. 8, 1934.

Neglect of Gas Lighting

SIR,—It was with pleasurable anticipation I commenced to peruse the booklet, "Please, Mr. Therm," issued by the B.C.G.A. As page after page was scrutinized and each successive page was found to be entirely devoid of any reference to gas lighting, to say the least, I was astounded. The climax, however, is the competition, "Plan a Kitchen." No lighting of any description is illustrated or mentioned. Surely the lighting of a kitchen is one of the essentials, and the position of the light contributes largely to the convenience of any layout of furniture and appliances. Such neglect of gas lighting, which is undoubtedly the main line of attack and defence against competition with other sources of light, heat, and power, calls for comment. I admit that as regards this particular competition it may be difficult to incorporate lighting, but certainly not impossible.

I am far from convinced that this apparent lack of confidence in gas lighting by the B.C.G.A. is representative of, and approved by, the Gas Industry. With up-to-date switch-controlled gas lighting we have a sound sales proposition if the enthusiasm and confidence to which it is entitled are adequately expressed to the public generally. I suggest that if the slogan, "Gas Light is the Light of the Present and the Future," was actively and confidently adopted, then the gas superiority complex would be further instilled into the minds of the public.

"GAS LIGHTING ENTHUSIAST."

Oct. 8, 1934.

Personal

Various changes have taken place in the Directorate of the Danish Gas Company following the death of the Chairman, Lt.-Col. M. M. Bidder in August of this year. At a Board meeting held in Odense on Sept. 29, Mr. HENRY WOODALL, M.Inst.C.E., the Senior Director of the Company, was elected Chairman, and Mr. H. G. WARREN, who retired from the position of London Agent to the Company on June 30 last, was chosen to fill the vacancy on the Board.

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Mr. EVAN REES, the Assistant Engineer of the Wandsworth and District Gas Company, is to be the Mayor of the Borough of Wandsworth for the ensuing twelve months.

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His many friends unite in hearty good wishes to Mr. ROBERT J. MEIKLEJOHN (Engineer, Manager, and Secretary of the Rugby Gas Company), who on Monday last was married to Mrs. E. R. Martin, of Rugby.

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The War Office announces that Major C. J. FALK, M.C., has been promoted to the rank of Lieut.-Colonel and selected for command of the 5th Battalion (Territorial) The Manchester Regiment, in succession to Lieut.-Colonel and Brevet-Colonel G. E. Allen, T.D., whose tenure expired on Sept. 20 last. Major Falk, who is a Director of Messrs. Falk, Stadelmann, & Co., Ltd., is the senior major of his battalion and succeeds to the command after four years in the rank. He was in France with his battalion, including employment in 1917 as instructor, 26th Divisional Infantry Base Depôt, and duty with a Service unit. He was awarded the Military Cross.

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To mark the occasion of his jubilee as a Director of the Whitchurch (Salop) Gas Company, Ltd., Major J. G. HARRISON, who became a Director in 1884, and for 34 years has been Chairman, was the recipient of a silver salver.

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As a token of esteem on the occasion of her marriage, Miss MARGARET WILSON, who has for many years been a member of the staff of the Troon Corporation Gas Department, was presented with a handsome Westminster chiming clock by the Provost, officials, members of the staff, and employees.

News In Brief

Public Lighting Contract.—The Halesowen Urban District Council have accepted the tender of the Cradley Heath Gas Company for street lighting in the Cradley Ward for five years.

Gas Boilers for heating the bath water are specified in a housing scheme prepared by Mr. C. Cheverton, Architect, Devonport, which has been adopted by the Torpoint (Cornwall) Urban District Council. The scheme comprises twenty-six houses.

The Commonwealth Tariff Board has been requested by the Australian Government to consider the question of reducing the import duties on coin mechanism for prepayment gas meters and also on indexes for gas meters imported separately.

A Cookery Demonstration has been arranged by the Thurso and North of Scotland Gas Corporation, Ltd., and is to be held in the Territorial Hall, Golspie, on Oct. 15 and 16. Miss E. D. Crossland will give demonstrations daily at 3 p.m. and 7.30 p.m.

A Correction.—Referring to page 86 of our last week's issue, by an unfortunate slip, the final four lines of the paragraph relating to the Cirencester Gas Company and the final line of that concerning the Peterhead Gas Department above became transposed.

The New Vertical Retorts at the Hawick Gas-Works were inaugurated on Sept. 29 by Mr. R. Grierson, Deputy-Chairman of the Company, who gave the retorts their first charge. This extension was made necessary by the recent increase of over 5% in the sales of gas.

The 29th Half-Yearly Meeting of the Auxiliary Section of the North of England Gas Managers' Association will be held at Newcastle on Nov. 24, when a paper entitled "Conservation of Heat Energy" will be read by Mr. W. Oliver Kirkwood, Chief Chemist to the Sunderland Gas Company.

A New Salesmen's Circle, covering the North London District, will hold its opening meeting at Woodall House, Lordship Lane, Wood Green, on Monday, Oct. 15, at 7 p.m. Mr. George Hunt Jackson, Managing Director of Fordson, Ltd., Enfield, will give an address on the subject of salesmanship.

We are Glad to Note from a recent advertisement appearing in the *Leamington Chronicle* that the Leamington Priors Gas Company have been quick to bring the B.C.G.A. Kitchen Planning Competition to the notice of their consumers. Mr. Therm draws attention to the Competition in a front page announcement.

A New Belgian Company has recently been registered under the name of La Société du Gaz d'Ecloo et du Nord de la Flandre Orientale to take over the Ecloo Gas Undertaking which was formerly operated by the Compagnie Belge d'Exploitations Electriques. The capital of the new Company is 2,211,000 francs.

Reconstruction at Greenock.—A sum of about £12,000 will be spent by the Greenock Corporation on the reconstruction of the retort house at their Gas-Works. Wherever possible allowance has been made in the estimates for the utilization of existing iron-work, &c., and the retorts will be in operation by September, 1935.

Application to the Ministry of Health.—Birkenhead Gas Committee recommended that, subject to the approval of the Finance Committee, application should be made to the Ministry of Health for sanction to the borrowing by the Council of £10,000 in respect of prospective expenditure on gas mains and £1,000 for gas services.

A Four-Days' Exhibition arranged by Messrs. R. & A. Main in conjunction with the Banff and Macduff District Gas Company was recently opened by Provost Christie. The exhibition was housed in the Company's travelling showroom which was stationed at the Greenbanks, Banff. A feature of the exhibition were the cookery demonstrations given by Miss Whittaker.

Low-Temperature Carbonization in Japan.—The Journal of the Fuel Society of Japan states that the Wanishi Steel Works of the Nippon Seitetsu Kaisha, Ltd. (the Japan Iron and Steel Company), is preparing plans for the establishment of a low-temperature carbonization plant at a cost of £90,000. It is reported that the new plant will have a capacity sufficient to produce 75,000 tons of semi-coke and 8,000 tons of tar per year.

"Technical and Scientific Encyclopaedia."—This is a new publication issued by Messrs. Hutchinson & Co. (Publishers), Ltd., dealing with terms, processes, and data in pure and applied science, construction and engineering, the principal manufacturing industries, and the skilled trades. Edited by C. F. Tweney and I. P. Shirshov, the new work is to be completed in about forty weekly parts, each part at the price of 1s. 6d.

To Augment their Capital to meet the cost of the new gasholder and other plant, the Cupar Gas Company propose to issue 4,500 5% preference shares at par. Resolutions will be submitted at an Extraordinary General Meeting to be held on Nov. 1 for issuing preference shares of £1 in lieu of the present £10 and £8 preference shares. The 4,500 new shares will, in the first place, be offered at par to the holders of ordinary shares in proportion to their holdings.

By a Narrow Majority the Darlington Town Council has decided to accept coke oven gas from Messrs. Straker & Love's Colliery at Brancepeth, 16 miles from Darlington and to cease manufacturing at the Municipal Gas-Works. It is estimated that the change-over will permit a reduction in the price of gas to the consumer of 2½d. to 4d. per 1,000 c.ft. and a saving of £8,000 a year, which should encourage industrial undertakings in the town to consume larger quantities of gas at lower rates.

The Technical Press, Ltd., have sent us a copy of their new catalogue of books for those interested in the various branches of Science, Industry, and Technology. Those connected with the Gas Industry will be interested in the section devoted exclusively to books dealing with the chemistry of gas manufacture, modern coking practice, gas-fitting, and appliances, &c. The publishers (5, Ave Maria Lane, Ludgate Hill, E.C. 4) are willing to send a copy of the catalogue, post free, to any of our readers.

Gas Production in Portugal.—The report of the Compagnies Reunies Gaz et Electricite, of Lisbon, which was recently issued, shows that there was a slight reduction in the quantity of gas manufactured during 1933. The output during the twelve months reached a total of about 405,667,000 c.ft., as compared with 407,891,000 c.ft. in 1932. On the other hand the quantity of gas sold by the Company increased from 336,020,000 to 340,609,000 c.ft. There was also an increase during the year in the number of consumers from 22,515 to 22,835.

New Coking Plant at Manvers Main.—The Manvers Main Collieries, Ltd., have decided to extend their coking plant at Wath-on-Dearne. It is barely a year since a new coke oven plant, upon which the Company expended nearly a quarter of a million pounds, was put into operation. This was so successful that the Company are going ahead immediately with the erection of an additional battery of 15 ovens. The contract for the new ovens has been placed with Simon-Carves, Ltd., Cheadle Heath, near Manchester, who were responsible for the erection of the battery completed last year.

One of the Most Attractive Stands at the "Brighter Homes" Exhibition now being held at the Fenton Street Drill Hall, Leeds, is that arranged by the local Gas Department. The stand has a good position at the centre of the Hall and is open on all four sides. Gas fires, cookers, washers, and household water heaters are among the appliances exhibited. Another stand of interest to the Gas Industry is that of Messrs. J. Brockhouse & Co., Ltd., Victoria Works, West Bromwich, who are displaying the "C.C." gas-ignited coke fire and the "2-in-1" fire which has separate sections for gas-ignited coke or gas only.

The Centenary Dinner of the Cambridge University and Town Gas Light Company, held at the Dorothy Café, Cambridge, on Sept. 28 and given by the Directors in recognition of faithful services by employees in all departments, was attended by 500 guests. The spacious ballroom of the café was too small to seat all the diners, and speeches had to be relayed to an "overflow" in an adjacent room. The principal toast was proposed by Mr. A. D. Rayner (Accountant), and the response was by Mr. J. F. Cameron (Chairman of Directors and Vice-Chancellor of the University). Silent tribute was paid the Company's late Manager, Mr. J. W. Auchterlonie. The Chairman, who referred to the increasing prosperity of the Undertaking, congratulated the firm's recreation club on the excellent arrangements for the dinner, which was followed by a concert and dancing.

Co-Partnership Conference.—In co-operation with the Watford and St. Albans Gas Company the Industrial Co-partnership Association is holding a Conference on Co-partnership in Industry on the afternoon of Monday, Oct. 22, at the Company's showrooms. Mr. Frank H. Jones, M.Inst.C.E., the Chairman of the Watford and St. Albans Gas Company and also Vice-President of the South Metropolitan Gas Company, will take the Chair, and the chief speaker will be Sir Montague Barlow, Bt., K.B.E., a former Minister of Labour. Any who are interested are invited to write to the Secretary, Industrial Co-partnership Association, 23, Abingdon Street, S.W. 1.

Meter Testing at Liverpool.—The Liverpool Corporation City Lighting Engineer tested 24,935 gas meters during the past year, of which 19,187 were for the Liverpool Gas Company, 2,365 for meter manufacturers, and 2,952 for local authorities. It is reported that 795, or 3% were rejected, and 17,305 or 69·4%, were of the prepayment type, The following are some of the reasons for rejections: Incorrect registration (fast, 189, slow, 126), 315; internal leakage, 76; external leakage, 71; passing gas without registering, 65; will not pass gas, 48; stops working, 20; excessive absorption of pressure, 166; defective marking, 4; defective indices, 23; other causes, rusty, &c., 7.

Outing at Blackburn.—Members of the staff and workmen of the Blackburn Corporation Gas Department held their annual excursion on Oct. 5. A party of 52 made the journey, the arrangements for which were made by Mr. George Beardwood, Secretary of the Greenbank Gas-Works Social Club. Before leaving, Mr. J. D. Ashworth, Engineer and Manager, bid the party adieu at the Town Hall and expressed his regret on being unable to accompany them as he was attending the funeral of an old servant of the Department. Tea was served at Morecambe, and the journey was then continued to Blackpool. In this way the autumn illuminations of the two principal West Coast towns were witnessed. A photograph appears on a later page.

Bradford Public Lighting.—In regard to our announcement in the "Personal" columns of last week's issue that the position of Lighting Superintendent at Bradford had been filled by the appointment of Mr. G. E. Currier, the new Gas Engineer and Manager, we are advised that this is liable to lead to some misconstruction. In this instance, and in many others where the public lighting of a town is effected by both gas and electricity, the Gas Engineer is automatically responsible for the gas section of the street lighting, and in that capacity may be regarded as the Lighting Superintendent of the gas illuminated thoroughfares. In the case of Bradford, there is no "Lighting Superintendent," as such, and never has been since the time when both gas and electricity have been used for the public lighting. Street lighting is controlled by a Sub-Committee acting in consultation with the Gas and Electricity Engineers, and, of course, Mr. Currier followed Mr. Crowther in the capacity of Superintendent of the gas section—just as Mr. D. T. Livesey, Jnr., has taken the place of Mr. Robert Watson at Doncaster; and the same applies in a number of other similar instances.

Amalgamation and Grouping.

South-Western Corporation and Blandford.

The offer made by the South-Western Gas Corporation to the Blandford Gas Company has been accepted by the holders of over 80% of the preference and ordinary shares.

Hastings Company's Efforts in Local Carnival.

Two decorated vehicles were entered by the Hastings and St. Leonards Gas Company in the recent local Carnival, which aroused considerable public interest.

One of these—a "Sentinel" steam wagon—a striking advertisement for gas water heating, which was carried to such a degree of realism as to show steam rising from the bath. The other display was mounted on a Thornycroft lorry and depicted a scene from "Robinson Crusoe," with a modern gas cooker in the centre of the tableau and the slogan—"If Robinson Crusoe could have had a gas cooker, all his troubles would have vanished."

In the evening procession the "Sentinel" wagon was floodlighted by means of gas from high-pressure cylinders, showing a fountain, tropical foliage, and waterfall to beautiful effect. The second vehicle on this occasion carried the "Bath for Two Coppers" display, and both entries were successful in winning prizes.

In the subsequent "Battle of Flowers" both vehicles again appeared, and another prize was won—the Company returning all the prize money to the Carnival funds for the benefit of the hospitals. The "Sentinel" display toured the Company's area of supply after the Carnival, where it attracted much attention.

Institution of Gas Engineers.

6th Autumn Research Meeting.

The Sixth Autumn Research Meeting of the Institution of Gas Engineers will be held on Tuesday and Wednesday, Nov. 6 and 7, at the Institution of Mechanical Engineers, Storey's Gate, St. James' Park, London, S.W. 1, commencing at 10 o'clock each forenoon.

The following Communications will be presented and discussed:

Standard Specifications for Refractory Materials for Gas-Works. (*Communication No.* 94.)

Report on the Use of Coal Tar Oils in Internal Combustion Engines, by H. M. Spiers, M.A., B.Sc., F.I.C., and E. W. Smith, C.B.E., D.Sc., M.Inst.Gas E., F.I.C. (*Communication No.* 95.)

Notes on the Visit of the Institution of Gas Engineers to Canada and the United States of America, 1933, by F. J. Dent, Ph.D., B.Sc. (*Communication No.* 96.)

11th Report of the Gas Education Committee; 1933-34. (*Communication No.* 98.)

5th Report of the General Research Committee; 1933-34. (*Communication No.* 99.)

34th Report of the Joint Research Committee of the Institution and Leeds University. Corrosion from Products of Combustion of Gas—Part II. Tube Experiments. (*Communication No.* 100.)

35th Report of the Joint Research Committee of the Institution and Leeds University. The Controlled Operation of a Carburetted Water Gas Plant—Part I. Factors Influencing the Performance of the Plant. (*Communication No.* 101.)

4th Report of the Liquor Effluents and Ammonia Sub-Committee. The Biochemical Oxidation of Gas-Works Liquors. (*Communication No.* 102.)

25th Report of the Refractory Materials Joint Sub-Committee. (*Communication No.* 103.)

Institution Gas Research Fellowship Report; 1931-34. The Reactivities to Carbon Dioxide of Cokes and Other Forms of Carbon at High Temperatures. (*Communication No.* 104.)

Requests for copies of the Communications, price 1s. 6d. each, should be sent to Mr. J. R. W. Alexander, Secretary, the Institution of Gas Engineers, 28, Grosvenor Gardens, London, S.W. 1.

Greenock's New Scale of Charges.

The Greenock Gas Committee have prepared a revised scale of charges for gas, to operate from the accountancy period commencing Nov. 16 next. The scale, which relates to consumption through ordinary meters, is as follows:

		Rate per Therm.
Up to	20·5 therms per quarter	7·25d.
Over	20·5 and up to 41·0 therms per quarter	6·25d.
,,	41·0 ,, ,, 102·5 ,, ,, ,,	6·00d.
,,	102·5 ,, ,, 307·5 ,, ,, ,,	5·50d.
,,	307·5 ,, ,, 1,025·0 ,, ,, ,,	5·25d.
,,	1,025·0 ,, ,, 2,050·0 ,, ,, ,,	5·00d.
,,	2,050·0 ,, ,, 4,100·0 ,, ,, ,,	4·75d.
,,	4,100·0 ,, ,, 8,200·0 ,, ,, ,,	4·25d.
,,	8,200·0 ,, ,, 12,300·0 ,, ,, ,,	4·00d.
,,	12,300·0 therms per quarter	3·75d.

Halifax Policy in Street Lighting.

At a meeting of the Halifax Town Council last week, discussion took place on the policy of the Lighting Committee regarding street lighting. Councillor Midgley drew attention to a resolution authorizing the installation of additional lamps in various streets of the borough, and asked how many of these lamps would be gas.

Alderman Stirk replied that 100% would be gas, electricity 0%, whereupon Councillor Midgley, saying that £19,894 was spent on gas lighting, and only £1,535 on electric lighting, urged "more modern street lighting." He was supported by Councillor Isles, but the amendment to refer the matter back was lost.

Alderman Stirk remarked that the Lighting Committee considered that there was no advantage in electricity over gas, and it was admitted generally that a gas-lighted street was better than an electrically-lighted one—a "fact established throughout the country." The Lighting Committee acted without prejudice.

[We would that all lighting committees were similarly unprejudiced.—Ed. "G.J."]

Blackburn Staff Outing

Members of the staff of the Blackburn Corporation Gas Department, together with their Engineer and Manager, Mr. J. D. Ashworth (front row, fourth from right), on the steps of the Town Hall prior to their departure for an excursion on Oct. 6.

Grid Scheme Failure.

Concern of Cinema Proprietors.

The following extract is from *To-Day's Cinema* of Oct. 1:

"In the course of a letter to Mr. R. Blackmore, Manager, N.W. England Central Electricity Board, Mr. C. W. H. Bowyer, Acting Secretary of the Manchester C.E.A., points out that 'at an executive meeting of the Branch very grave concern was expressed by a number of members due to the failure of the grid scheme on Saturday, Sept. 15.'

"The letter points out that 'it was only when committee-men from town after town unfolded the story of what took place in their theatres that the realization of a possible calamity was thrust before us.

"'Without going into the effects of the failure (although in one case it is reported to have been the cause of a fire in the operating box which resulted in a section of the programme being burned out, luckily there was no panic and the patrons left the building safely) and without being unkindly disposed to the persons operating the grid scheme, my Committee feel there is something not quite right with this scheme.

"'The system does not seem to be as foolproof as ought to be expected.'

"The letter goes on to say that this is the second occasion (taking the North Country failure of a few months ago as the first) on which a black-out has occurred.

"While not wanting to go to the trouble or incur the expenses of installing oil-engine plant, they see no other alternative if their business is to be interrupted in this manner."

Lichfield Gas Company.

Reduction in Charges for Gas.

A substantial reduction in the price of gas is announced by the Lichfield Gas Company, taking effect from the beginning of the Michaelmas quarter. Control of the Lichfield Gas Company was recently acquired by the merchant banking firm of Dawnay, Day, & Co., Ltd., on account of Gas Consolidation, Ltd.

This reduction was made possible as a result of working economies which have been effected since its amalgamation with other companies by Messrs. Dawnay, Day, & Co., Ltd.

The reductions are as follows:

Ordinary Consumers.

Quarterly Consumptions.	Present Price.	New Price.
Up to 2 500 c.ft., or 11·25 therms . .	12d. per therm	12d. per therm
Next 47,500 c.ft., or 213·75 therms . .	12d. ,,	10d. ,,
Over 47,500 c ft	12d. ,,	9·5d. ,,

The above prices are subject to a reduction of 5% discount for cash if accounts are settled within one month, provided that no arrears are outstanding.

Slot Consumers.

Quarterly Consumptions.	Present Price.	New Price.
Up to 2,500 c.ft., or 11·25 therms . .	14d. per therm	14d. per therm
Over 2,500 c.ft.	14d. ,,	12d. ,,

The Essential Service.

No Comfort Without Gas.

The provision of up-to-date gas equipment has solved many problems that faced the builders of the Tynemouth Park Housing Estate in their endeavour to provide homes possessing every convenience at a moderate price.

According to the *Newcastle Journal* for Sept. 28, since comfort depends chiefly upon warmth, gas fires are an indispensable item. These ideal homes are fitted with labour saving gas equipment to meet every need—to cook to perfection, to keep food fresh and wholesome by refrigeration, and to provide quick and cosy fires and hot water automatically.

In the bathroom, a neat little gas heater ensures hot water to all the hot taps at remarkably low cost, while over the sink a handy little gas heater provides steaming hot water for washing up and domestic purposes. A neat gas panel heater keeps the entrance hall warm and free from cold draughts. There is also a gas washer, which does a whole week's washing in an hour. Helpful advice regarding heating, cooking, and hot water problems is willingly given to visitors to the show house.

Back to Gas.

Lighting of Banbury Cross.

Banbury Cross will in future be lighted by gas. This was the decision of the Banbury Town Council, who, at the meeting on Oct. 1, accepted the recommendation of the Streets, Roads, and Markets Committee.

The new island at the junction of Southam Road and Warwick Road will be illuminated in the same way.

The Committee's recommendation was that, subject to the concurrence of the Finance Committee in the expenditure, the tender of the Banbury Gas Light and Coke Company be accepted as follows, and that the Town Clerk be authorized to prepare and affix the corporate seal to the necessary contract:

(1) Lighting in the vicinity of the Cross in the position at present lighted by electricity: Two eight-light lamps on each of the three standards, each lamp to be of 800 candle-power. One six-light lamp on each of the two suspension brackets, each lamp to be of 600 candle-power. The Company to provide and fix the lamps and standards and to maintain the apparatus and supply gas for a period of three years from Jan. 1, 1935.

(2) The central lighting of the street island refuge at the junction of Southam Road and Warwick Road: One standard with three six-light suspension lamps, each lamp to be of 600 candle-power. The Company to provide and fix the lamps and standards and to maintain the apparatus and supply gas for a period of three years from Jan. 1, 1935.

In moving the recommendations, Alderman J. Collingridge, Chairman of the Streets, Roads, and Markets Committee, said that two tenders were received, one from the Shropshire, Worcestershire, and Staffordshire Electric Power Company and the Banbury Gas Light and Coke

Company, and the one from the Gas Company was very much cheaper. The Committee was of the opinion that the lighting would be quite equivalent to that of electricity and they therefore recommended that the Gas Company's tender be accepted.

Developments at Liverpool.

The Liverpool Gas Company is preparing to move its Head Office for the third time in 118 years. The Engineer's Department will occupy the Duke Street Offices, with the workshops in Kent Street and Cornwallis Street and the new Industrial Laboratories and Showroom—to be opened this month—in Grenville Street South.

Model of the Liverpool Company's New Showrooms.

The Architects of the new building are a Liverpool firm—Messrs. Quiggin & Gee, FF.R.I.B.A., who have projected a modern steel framed building of fireproof construction to be erected on the 100 ft. frontage formerly occupied by Messrs. Woollrights in Bold Street.

The principal elevation of the new structure will be of Portland stone with a shopping arcade at ground floor level of marble. Showrooms will occupy the ground floor and part of the basement, while the first floor will have a lecture room to seat 350 people, where demonstrations of cooking and housecraft will be given. This room is to be fitted with cinema projectors, and a reception room is also provided for on this floor.

There will be public telephones, and between the various departments, vacuum intercommunication, and the whole building will have gas as an illuminant for lighting and flood-lighting, as well as for heating and cooking. The heating chamber and kitchens will be constructed as Exhibition Rooms and will be open to the public.

The building line of Bold Street has been studied by the Architects, who have set back the new building at the fifth floor.

The sixth floor has a " return " built as a Board suite, and this structure will be roofed with copper.

There is no doubt that the erection of this building will add considerably to building values in Bold Street. Already there are signs that the enterprise of the Liverpool Gas Company has given a new lease of life to what still is Liverpool's best shopping centre. A scale model of the new building, shown in the accompanying photograph, is on view at the Autumn Exhibition of Art held annually in the Walker Art Gallery at Liverpool.

Liverpool and District Gas Development Centre.

The new industrial showrooms and laboratories of the Liverpool Gas Company will be opened officially on Oct. 16 by Dr. E. Leslie Burgin, M.P., Parliamentary Secretary to the Board of Trade. The official opening will be followed by a luncheon at the Adelphi Hotel, Liverpool, when the Lord Mayor of Liverpool will be present and many prominent people will support Dr. Burgin and Sir Christopher Clayton, M.P. (Chairman of the Liverpool Gas Company).

The Industrial Demonstration Room is fitted with connected apparatus used in many of the trades in the area of the Centre. Among the appliances on view are a bottle sterilizer, a pie-warmer, and a tempering plate—all products of the Laboratory.

Ilfracombe's New Showrooms.

New showrooms and offices at the junction of High Street and Northfield Road were opened on Friday last for the Ilfracombe Gas Company by Sir Francis Goodenough, C.B.E. They have been built by Messrs. W. Pearce & Son, of Ilfracombe, the Architects being Messrs. Whinney, Son, & Austen Hall, of London. The Clerk of Works was Councillor A. G. Snow, of Ilfracombe.

These premises in their ideal situation should play a great part in moulding the future success of the Company. The main entrance at the angle of the two thoroughfares leads directly to the main showrooms, in which a display of modern gas fires is shown to advantage. The ceiling with its fibrous work coloured green and pink is not the least compelling of the rooms' amenities, and the walls with beautiful veneered panels are also striking. The floor is a solid and elegant construction in travertine marble. The ventilation is directed through the grill in a small platform round the room, and the lighting is of " sub-ceil " effect. There is an inner showroom in which gas cookers and other appliances are exhibited.

It is obvious that in planning these rooms care has been taken to utilize every foot of space and to present the various gas appliances in an effective manner. Extra space is created by filling up the angles of the walls with gas fires in positions which represent the best aspect to customers. In addition to the showrooms on the ground floor there are the rental offices of the Company and the staff staircase connecting all the departments.

The dignified main staircase is lined with black marble treated in the most up-to-date fashion. At the top of the stairs is the board room, and the greater part of the upper floor is occupied by administrative offices. In the basement there is accommodation for the Company's stores, fitters' shops, meter testing rooms, and engineering services.

The exterior of the building is of a design which is fast finding favour. The preference for ample light requires larger glass surfaces than hitherto, thus necessitating the use of horizontal windows whenever possible. The judicious blend of brick and stone gives colour and variety to the front of the building, and a plinth of black marble emphasizes the effect of the windows looking on High Street.

The events of the day opened with an official welcome extended by the Chairman of the Ilfracombe Urban Council, Mr. W. H. Roulstone, J.P., to the delegates attending the South Western District Conference of the Association.

The President of the Conference, Mr. R. M. Rowe, C.C., Chairman of the Ilfracombe Gas Company, in his address said gas services had been responsible for a big advance in the home life of the nation. There had been spectacular developments in home planning and home running. In every department of housework the woman of to-day had labour saving and comfort-bringing appliances at her command that were utterly unknown fifty years ago.

Sir Percy Alden (Chairman of the British Institute of Social Service) then gave an address on " National Health and the Gas Industry."

After the Conference a luncheon was held at the Ilfracombe Hotel. Mr. R. M. Rowe presided. The toast of the " Town of Ilfracombe " was submitted by Sir Francis Goodenough and responded to by Mr. W. H. Roulstone.

Sir Basil Peto, Bt., M.P., proposing " The Gas Industry,"

said the Industry was playing a great part in the prosperity of the country.

At the opening of the new offices and showrooms of the Ilfracombe Gas Company, Mr. Rowe presiding, Sir Francis Goodenough said he was delighted to note a growing appreciation of the importance of art in commerce and industry. This had not been least noticeable in the Gas Industry, which had given a splendid lead to other trades.

The day's proceedings were concluded by an interesting talk by Mrs. Eileen Murphy, of the British Commercial Gas Association, on "Planning the Home."

New Absorption Pipette.

Readers will be interested in a new absorption pipette for gas analysis apparatus manufactured by Messrs. Townson & Mercer, Ltd. The construction of this Stanier bulb is such that it gives the gas which is being tested a bubbling contact with the reagent both on entering and leaving, thus adding greatly to its absorbing efficiency.

Those acquainted with the estimation of carbon monoxide with a solution of cuprous chloride know how tedious the operation is in the Orsat apparatus, how difficult it is to obtain complete absorption and be certain of results. This new bulb, it is claimed, takes most of the uncertainty away and with a fresh solution of cuprous chloride the absorption is completed in a very short time.

It is stated that the manipulation is quite easy and the gas can be taken in and out of the pipette at a rapid rate without any possibility of loss (a loss which is probable in using the type filled with glass tubes) and without any chance of the reagent running over into the measuring tube.

New Glover-West Verticals at East Hull.

Aiming at Lower Prices.

On Friday, Oct. 5, the Directors of the East Hull Gas Company inspected the installation of Glover-West vertical retorts which has now been completed and brought into operation at their Works.

The plant consists of 18 retorts, each capable of producing over 100,000 c.ft. of gas per 24 hours of a calorific value of 465 B.Th.U. gross from the best Yorkshire screened coals. The plant is fully equipped with a coal and coke conveyor of the latest "lipped" gravity bucket design, with automatic forced lubrication, coke grading and waste-heat recovery plant.

At the luncheon which followed, and which was attended by Messrs. F. J. West, Ernest West, and representatives of the Press, together with Mr. Richard Nelson (Engineer and General Manager), Mr. T. W. T. Hammerton (Secretary), and members of the staff, the Chairman (Mr. Boswell G. Jalland) said they had chosen the most suitable plant for the requirements of the district. This system, which was the outcome of from 20 to 25 years' experience, was not new to the Gas Industry, but was well-known throughout the world. It included all improvements in carbonization up to the present time.

"The Directors are confident," he said, "that when the plant has settled down to normal working and the staff have got over the running-in period, not only will its advantages be of benefit to the Company and its employees, but to all the gas consumers in East Hull."

Mr. C. N. Jackson (Deputy-Chairman) said that, in spite of difficulties, their Company had paid its maximum dividend since it was founded in 1846, and yet their price had been only 7d. a therm charged to the consumer in the city since 1928—a charge which would compare favourably with that charged by most other companies. "But we want to do more," he said. "We want to reduce the price still further. To attain this object we have had to make a drastic saving in the cost of the manufacture of gas, and that is why we have expended a very large sum on our new installation."

Mr. F. J. West, speaking of the challenge offered to the Gas Industry in these days of progress, said it had kept well abreast of the times, and had adapted itself to modern requirements and to modern ideas of convenience and hygiene. In the past few years new plant and equipment had been installed on an immense scale. The Industry had adopted new methods of research and had revolutionized its marketing policy. An example of the advance made in the last 25 years was afforded by the carbonizing plant you have inspected to-day, he said. Twenty-five years ago a gas yield per ton of coal carbonized of 11,000 c.ft., equivalent to just over 60 therms, was considered excellent practice. In the plant you have seen to-day 20,000 c.ft. per ton, or well over 90 therms, is being made without any particular effort.

Investors' Gas and Electric Trust.

It is officially announced that an initial distribution, amounting to 3·051d. net on each sub-unit of Investors Gas and Electric Trust, will be paid on Nov. 1, 1934, to Certificate-holders on the register on Oct. 5, 1934.

This net initial distribution, which is equivalent to 3·937d. per sub-unit before deduction of income-tax at 4s. 6d. in the £1, represents income received between May 1, 1934, the date of establishment of the Trust, and Oct. 6, 1934, from dividends paid by the fourteen companies in the Trust portfolio.

On the basis of the actual dividends paid during the last twelve months, the gross annual yield on Investors Gas and Electric Trust sub-units, amounts at the current price of 15s. per sub-unit to £4 4s.% per annum. There have been no new issue rights from any of the companies in the Trust portfolio during the period since May 1, but these on an average during the past five years have represented an addition to the yield of 15s.% per annum.

New Scale of Charges at West Bromwich.

Recommendations to the West Bromwich Town Council for reductions in the price of gas were referred to in detail on page 52 of last week's "JOURNAL." Mr. J. Hunter Rioch, the Gas Engineer and Manager, informs us that the new scale of charges has now been adopted to take effect as from the commencement of the December quarter.

To the figures given last week may be added 3·5d. for all consumption in excess of 9,000 therms per quarter—subject to the load factor and other characteristics of the supply being to the approval of the Gas Engineer and Manager. All the prices mentioned for ordinary meters are subject to 5% discount for prompt payment.

It may be mentioned that previously there were two scales of charges for gas used through ordinary meters, one for domestic consumers and one for industrial consumers. It has now been decided to merge these two scales into one, and at the same time to reduce very considerably the price, the concessions varying from 0·4d. to 2·9d. per therm.

It will also be noted that, whereas formerly prepayment consumers were on a flat rate, a scale similar to ordinary consumers has now been adopted.

The object of the new scale is to develop the use of gas in the district, and in this connection the rates to large consumers are very attractive. The Gas Department anticipate a very considerable increase in the industrial load as a result of the concessions now made.

A Hundred Years of Gas at Basingstoke.

Centenary Celebrations.

Last week the Basingstoke Gas Company commemorated the 100th anniversary of their service to the town. The series of events marking the celebration commenced on Saturday, Sept. 22, when the Mayor (Mr. R. H. Howard) opened a recreation room at the Works for the use of the Company's employees. A noteworthy feature is that the decoration and adaptation of this room has been successfully undertaken by the workmen themselves in their spare time. To this work they have devoted many hours and they are to be congratulated on the provision of a room in every way worthy of its purpose.

Another pleasing incident in the proceedings was the presentation of long service certificates to seven of the workers who have completed thirty years or more of service with the Company. They received their certificates at the hands of Mr. William Higgs, J.P., who has been connected with the Company for over half a century. A historical sketch, from which we give extracts below, has been ably compiled by Mr. H. C. Higgs, who succeeded his father as Managing Director and Secretary of the Company. The opening of the recreation room and presentation of long-service certificates was followed by a supper and entertainment. The centenary was further commemorated during the week by a series of cookery demonstrations, combined with an exhibition of the most modern gas apparatus. These demonstrations, together with the exhibition, took place in the Town Hall and attracted very large attendances.

Historical Sketch.

The history of the Basingstoke Gas Company covers a period of one hundred years, the Company having been established in the year 1834. The capital of the Company

was £3,000, divided into 120 shares of £25 each, and it was provided that this might be increased from time to time by special meetings of shareholders. No permanent Chairman of Directors was appointed. One of the members present was elected to preside at the meetings, and this was usually the Mayor if present. There were 150 consumers to start with, and this, together with the sale of coke and a few public lamps, provided the revenue for the first year, the price of gas being at the rate of 14s. per 1,000 c.ft. In 1841 the prospects of the Company became brighter. The consumption of gas considerably increased, due to the opening of the London and South-Western Railway, and to the more general appreciation of the value of gas both for private and public use. From this time onwards the Company made steady progress. Obsolete plant was replaced with improved apparatus, and in 1862 it was found necesesary to enlarge the Works. Again, in 1876, the consumption of gas had increased so much that further extensions were necessary, and at this time the share capital employed amounted to £11,000.

In November, 1886, notice was given of an application to Parliament for the incorporation of the Company under a special Act, containing the usual clauses, and in July of the following year the Royal assent was given and the Company became incorporated as the Basingstoke Gas Company. The necessary capital was then raised for remodelling and enlarging the Works. Suitable plant for the treatment of the residual products was installed, sulphate and ammonia were manufactured, and, later, the preparation of dehydrated and refined tar for road-spraying, besides the recovery of other products from tar distillation were undertaken. In 1906 further powers were sought and the second Basingstoke Gas Act was passed in 1907, just twenty years after the Company's incorporation.

To-day the gas mains are laid throughout the whole of the Borough of Basingstoke, and are extended to include the villages of Basing, Worting, and Cliddesden, also the Park Prewett Estate, making a total of 19 miles. The sales of gas amount to 70,000,000 c.ft. per annum, and the total number of consumers supplied is 3,450, of which 2,840 are on the prepayment meter system.

Thermochemistry.

In April, 1933, the Standing Commission for Thermochemistry of the Union Internationale de Chemie decided to publish periodically reports upon thermochemical researches of a general character and which have recently appeared in the Scientific Press. It was agreed at the same time to publish at intervals summaries upon the numerical data which are indispensable for carrying out thermochemical calculations.

We have now received from the Secretary of the Federal Council for Chemistry (of which the Institution of Gas Engineers is a constituent organization) the First Report of the Standing Commission of the Union. The Report deals with the determination of the heat of combustion of substances containing the elements carbon, hydrogen, oxygen, and nitrogen.

Copies of the Report may be obtained from the Secretary, International Union of Chemistry, Maison de la Chimie, 28, Rue Saint-Dominique, Paris.

Smoke Abatement Conference.

The delegates who attended the 6th Annual Conference of the National Smoke Abatement Society in Glasgow were given a civic reception on Sept. 27 in the City Chambers. They were received by Lord Provost Swan and Mrs. Swan.

In welcoming the delegates to Glasgow, the Lord Provost said that smoke prevention was perhaps one of the most important subjects with which they could deal. The health of the people should be the first consideration of those who represented them. Generally speaking, they thought of air spaces, hospitals, welfare centres, and other municipal activities, but there was nothing more harmful to the health of the people, especially during the months on which they were now entering, than an impure atmosphere.

They could also look at the subject from an economic as well as from a health point of view. In Glasgow they were in the middle of a big coalfield, and they were wasting an asset which could not be replaced. They were not getting the results from that product which in an economic way they ought to get.

Dr. H. A. des Vœux, President of the National Smoke Abatement Society, thanked the Lord Provost for the welcome he had given the delegates. He had come that day from Edinburgh, and he was distressed to see that the beautiful buildings of that city were as black as those of Glasgow. He believed that Edinburgh was known as the most beautiful city in the country, but it was spoiled by the filth of its buildings. In Glasgow they had also beautiful buildings which were spoiled in the same way. Glasgow had done perhaps more than any city in the kingdom to carry out the Acts of Parliament that had been passed to ensure purity of the atmosphere, but these Acts stopped short of the most important part of the problem—the domestic fire. So long as they submitted to the burning of coal of a bituminous nature in domestic fires, so long would they have smoke. Something must be done to stir the consciences of the people. He suggested that the municipality should circularize all the people of the city so that they might give up using their dirty, smoky fires if other means were provided.

On the following day Councillor W. Brownhill Smith, Acting President of the Scottish Branch of the Society, gave an address. He said that at least 6% of the bituminous coal burned in domestic fireplaces escaped unconsumed into the atmosphere as soot. That meant that nearly two and a half million tons of soot escaped into and polluted the atmosphere every year from domestic fireplaces alone.

Continental Notes

Effect of Reduced Throughput on the Fuel Consumption of Carbonizing Plant.

E. Dubois in *Das Gas- und Wasserfach*, 1934, 77, 556-561 (Aug. 18), discusses mathematically, with the aid of graphs, the effect of throughput of coal on the fuel consumption of carbonizing plant. Since it may often happen that a carbonizing plant has to be worked at a reduced throughput, it is desirable that the design of the plant should be such that the fuel consumption in relation to the weight of coal carbonized should not increase unduly under these conditions. A comparison is made between horizontal retorts, horizontal chamber ovens, intermittent chambers, and coke ovens, more especially from the viewpoint of weight of charge, carbonizing time, and radiating surface of brick and iron work. The following conclusions are drawn:

(1) The cubical displacement of the setting in relation to its gas-making capacity should be as small as possible in order that radiation losses may be reduced to a minimum. Progress in this direction is limited by the fact that the combustion flues must be accessible and must be wide enough to prevent too speedy blockage with fuel ash.

(2) The carbonizing chamber should be as narrow as possible and the carbonizing time short so that the throughput may be as large as possible in relation to the available volume. Practical limits are set by the inaccessibility of excessively narrow carbonizing chambers, by the small size of the coke produced, and, in large installations, by the small weight of the charge which results in increased labour costs.

(3) Long carbonizing chambers are desirable in the case of horizontal retorts and horizontal chamber ovens. The fact that regulation of heats is the more difficult as the length increases limits the length which can be adopted. Nevertheless, the 11 ft. 6 in. retort length which is quite frequent practice, nowadays, seems too short in view of the fact that, even in small works, the charging of long retorts or chambers by cheap means is possible.

Notes on the Visit of the Institution of Gas Engineers to Canada and the United States of America, 1933

A Report by Dr. F. J. Dent, B.Sc., to the General Research Committee of the Institution of Gas Engineers, to be presented at the Research Meeting, Nov. 6 and 7

SUMMARY.

This communication is a condensed version of a report made to the Joint Research Committee by the writer upon his return from the Visit of the Institution of Gas Engineers to Canada and the United States from 8th September to 16th October, 1933.

In these Notes no attempt has been made to represent all the various aspects of the American Gas Industry in proper perspective, for during the visit, in face of the multitude of matters of interest and the relatively short time available, selection was necessary to prevent attention becoming too dispersed. The writer's selection, therefore, was influenced mainly by the nature of the work being carried out by the Joint Research Committee, by his connection with Leeds University and by the suggestions received from various members of the Institution who had previously visited North America.

Thus, a considerable part of this Report is descriptive of American water gas practice, of research activities coping with Canada's peculiar fuel problems and of American research and industrial institutions.

In considering American water gas practice, due prominence is given to the circumstances which have directed its development, to the results of water gas forming a considerable proportion of the gas manufactured, to the availability of cheap enriching agents, and to the manner in which the flexibility of the process enables it to be used to control mixtures of coke oven gas, natural gas, &c.

In Canada the writer was impressed by the unfortunate localization of the Dominion's immense coal deposits away from the industrial region, and by how, in the past, Canada has been dependent upon a single and foreign fuel supply but was now utilizing its own resources of both fuel and water power to a much greater extent.

Of the research and industrial institutions visited notes are included on The Surface Combustion Corporation, Toledo, The Research and Testing Laboratories of the A.G.A. at Cleveland, The Coal Research Laboratory at the Carnegie Institute of Technology, Pittsburgh, and the U.S. Bureau of Mines. The constitution and work of the A.G.A. Laboratories is given in some detail, and for the data given grateful acknowledgment must be made to R. M. Conner, Director of the Laboratories.

CANADA.

(1) Introduction.

The carbonization industry in Canada is so intimately connected with the Dominion's peculiar fuel problem that it is difficult to discuss the one without first outlining the other.

Canada has an abundance of coal deposits, but they are unfortunately concentrated in the eastern and western extremities, leaving the populous industrial section of Ontario and Quebec dependent upon other sources of supply. Up to approximately ten years ago this source of supply was the U.S.A. coalfields, which are but a few hundred miles away from Canada's most densely populated region.

From the Canadian point of view, the uncertainty of obtaining bituminous coal and anthracite from the U.S.A. has been repeatedly demonstrated. The occurrence of coal strikes in the United States in 1902 and 1922 gave rise to fuel famines in Canada with serious consequences.

The effects of the strike of 1922 were so severe that it was generally realized that immediate steps must be taken to abolish Canada's reliance on a single and foreign fuel supply, and the Dominion Fuel Research Board was founded towards the end of 1922 to investigate the problem.

The ideal at which the Fuel Board aimed was that of making Canada dependent on her own resources, but, failing that, to find ways of avoiding any recurrence of the disastrous fuel famines that Canada has known in the past. After a considerable amount of work it is now realized that the possibility of attaining the ideal is remote, but it can be said that Canadian dependence on anthracite from the United States has been almost abolished.

The progress which was made in the five years following the foundation of the Board is illustrated in Table 1, which gives the consumptions of various domestic fuels for the years 1923 and 1927.

In 1923 approximately 90 per cent. of the domestic fuel used in Canada was American anthracite, compared with 60 per cent. in 1927. The significance of Table 1, however, lies not so much in the actual changes in the relative amounts of the various items but rather in that it shews that the strong prejudice which the Canadians used to hold in favour of anthracite is being broken down. It is now realized that, in cases of emergency, other fuels are available which can be burnt satisfactorily.

The prejudice for anthracite used to be stronger in Canada than in the United States itself, where the use of cheaper bituminous coals is more popular. The Canadian attitude is probably due to the more severe winters necessitating a fuel in which the utmost reliance can be placed, and also to the fact that when the freightage costs of anthracite and bituminous coals in Canada are added to the American prices, the relative difference in prices of the two fuels is reduced.

Table 1.—*Canadian Consumption of Various Domestic Fuels.*[1]

—	1923.	1927.
1	2	3
	Tons.	Tons.
Imported anthracite from the U.S.	4,753,873	3,073,033
Imported British anthracite	207,282	720,203
Coke	270,000	812,000
Low-volatile coals	180,000	386,000
High-volatile coals	..	> 1,000,000

The Fuel Research Board had, however, another aspect of the problem before it, namely, that although the potential supplies of U.S.A. bituminous coals are ample, it is estimated that the anthracite fields, at the present rate of consumption, will last only 80-100 years, and the particular field supplying Canada only 30 years. The price of anthracite in Canada must in any case increase rapidly, and there is the continual danger that public opinion in the United States may at any time swing against the exporting of the remaining supplies. For this reason alone it was necessary to educate the Canadians to use fuels other than anthracite.

(2) The Development of Canada's Fuel Resources.

The Dominion Fuel Research Board attacked the problem assigned to it by first making a survey of the possibilities in Canada's own resources. The chief of these are:—

(*a*) Coal deposits in British Columbia, Alberta, and the Maritime Provinces.
(*b*) Immense undeveloped water power.
(*c*) Deposits of peat in Ontario, where the fuel problem is acute.

(*a*) *Coal Deposits.*

The greatest obstacle to the use of Canadian coals is the question of freightage. It is not possible to deliver the

[1] Most of the figures in this section of the Report have been taken from the Reports of the Dominion Fuel Research Board.

coals into Ontario and Quebec at prices which enable them to compete with those from the United States. No exact information was forthcoming on the cost of freightage, and, accordingly, the Canadian Government subsidized the railways for a period during which Canadian coals were transported and used and the cost of transport determined. The results of these tests confirmed the opinion that, without a permanent subsidy, Canadian coals could not compete in Ontario under present conditions.

There are, however, other difficulties in the use of Dominion coals apart from that of freightage, due to the coals being of low quality—most of them do not yield a strong coke, are high in ash and sulphur content, are liable to spontaneous combustion, and, compared with anthracite, have ashes of low fusion point.

The Research Board and such institutions as the Research Foundation at Toronto, have made investigations on the best methods of treating and utilizing such fuels. Realizing that, for domestic purposes, the cokes from the coals were much more likely to find use than the coals themselves, the coal seams have been surveyed, and carbonization tests made on the various coals available. A study has been made of the improvements obtainable by washing and screening, the feasibility of blending Canadian with coals from the United States, the factors which influence clinker formation, and, in particular, attention has been paid to the use of coke in domestic furnaces.

From the Canadian point of view, the most important result which has so far arisen from the investigation is that some of the Canadian coals, although not suitable for carbonization alone, produce excellent cokes if they are washed and screened at the mines and then blended with bituminous coals from the United States. In view of the value of this observation, the Canadian Government has offered to subsidize the capital charges on by-product oven plants in which domestic coke is manufactured from blends containing more than a certain percentage of Canadian coal. This subsidy applies only to oven plants since experience has shown that, because of its greater density, by-product coke approaches the requirements of a domestic fuel for Canada more closely than gas retort coke.

(*b*) *Water Power.*

Canada possesses immense resources in its water power. This is realized from the figure given by the Dominion Fuel Research Board for the coal equivalent of the power actually developed. It was computed that in 1926 the amount of coal saved by water-power installations in Canada was 17 Mn. tons. In the same year the coal imported into Canada was 18 Mn. tons. It was also estimated that the horse power of the turbines actually installed did not amount to one-fifth of the horse power which is available. These figures emphasize the importance of Canada's water power in relation to her fuel problem.

The necessity of making the utmost of this natural resource is well appreciated, and the development of this energy, and its distribution as electricity, is proceeding rapidly. In the period 1923 to 1928 the horse power of installed turbines increased from 2,970,000 to 4,880,000.

It does not appear, however, that electricity will enter as a serious competitor into the domestic heating field in the near future. If electricity were sold at 0·425 cent a unit, and anthracite at 17 dollars a ton, costs would balance. But 0·425 cent a unit is well below the present average price of electricity, and although the price of anthracite may quite readily increase to the figure quoted, coke could be manufactured and sold with profit at a smaller figure, without relying on a high revenue from the gas produced. Development is anticipated in the domestic utilization of off-peak load hydro-electricity for water heating, &c.

The direction in which hydro-electricity is most likely to expand appears to be for industrial use and as an export to the U.S.A.

(*c*) *Deposits of Peat.*

There are large deposits of peat in Ontario, the area in which the fuel problem is most acute. Experiments have been made on the production of a dried peat fuel, and a successful process of manufacture has been evolved at Alfred. Although peat cannot be placed in the same class as the denser fuels for winter heating, an attempt is being made to introduce it for spring and autumn use.

(3) The Development of Alternative Foreign Fuels.

Apart from the development of Canada's own resources, there is the further aspect of the Dominion Fuel Research Board's work, viz., the training of domestic consumers to use a substitute for anthracite from the rapidly depleting American fields, irrespective of the source of the substitute. Table 1, earlier in this section, indicates the advance that has been made in this direction, and also the fuels which are coming into general use.

Among them is British anthracite. The magnitude of the exports of anthracite from this country first became appreciable during the strike in the United States. Markets established at that time have been largely retained. British anthracite is favoured because its ash content is lower than that of the American, although this advantage is in part discounted owing to the ash fusing at a lower temperature. A difficulty was at first experienced on account of the friability of the British anthracite, but this has been overcome by establishing screening plants at the unloading wharves in Canada.

Reference has already been made to the use of coke, and its good prospects as a substitute for anthracite. Other possibilities are the use of American coals of lower grade—*i.e.*, semi-anthracite and bituminous coals, extensive deposits of which are known to exist.

As stated previously, the use of bituminous coal has never been popular in Canada owing to its smokiness, and troubles arising from its coking properties. It is probable that furnaces could be designed to use bituminous coals satisfactorily, but Canada's problem is to find a substitute capable of use in the present furnaces designed for anthracite. In Canada it is not thought that bituminous coals will be used at all extensively for this purpose.

Semi-anthracites from the United States are much more satisfactory and their use is spreading. They are likely to be the strongest competitor to coke in the domestic fuel market in the future.

Canada's own sub-bituminous coal in Alberta can be burnt quite satisfactorily, but, as already indicated, freightage costs prevent their competing in Ontario and Quebec. They are coming into use to a considerable extent, however, in Manitoba.

Oil in Canada is definitely a luxury for domestic heating, and its use is confined to the wealthier classes. In 1926 the quantity of fuel oil consumed in Canada was reported as 275 Mn. gallons, the bulk of this being used in the coast cities of British Columbia, where imported oil is relatively cheap. Only 28 Mn. gallons were used for domestic purposes in Ontario and Quebec.

Large discoveries of natural gas in Alberta are providing a fuel supply of considerable importance for domestic heating and industrial use in that locality. The fields in Ontario are, however, nearing depletion, and will not make any appreciable contribution to the solution of Canada's fuel problem.

The quantity of natural gas used for domestic purposes in Ontario in 1926 is estimated as 5,700 Mn. cu.ft.

(4) The Position of the Carbonization Industry.

At present, manufactured gas is sold in Canada mainly for cooking and water heating, small amounts being used in industry. The annual sales in the Dominion approximate to 18,000 Mn. cu.ft. For the uses mentioned electricity is in strong competition with gas, and it appears as if the competition will grow keener with the further development of water power.

On the other hand, as the prejudice for anthracite from the United States as the ideal industrial fuel is being broken down, and since the cost of this import is bound to increase, it appears that coke will be used more and more for central heating purposes.

THE UNITED STATES OF AMERICA.

(1) Introduction.

A feature of the American Gas Industry which greatly impressed the writer in making the Institution Visit was the variety of the sources and methods of manufacture of the gas supplied in different localities. In the United States as a whole, all the natural fuels exist in quantity, but their geographical distribution and cost of transport leads to wide variations both in manufacturing methods and in the character of the gas distributed.

The Visit was largely confined to the Eastern States, but included one excursion to Chicago in the Middle West. Even so, it can be stated that the relative values of the fuels, anthracite, bituminous coal, coke, gas oil, heavy oil, natural and refinery gases, were different in almost every place visited, and this was reflected in the operations of the various gas companies.

America may be regarded as the home of water gas manufacture, and, soon after its invention in 1875, water gas production rapidly overtook that of coal gas. The main reasons for this were the availability of cheap oil, the difficulty in the disposal of coke in the face of cheap supplies of anthracite and the greater flexibility of the water gas

plant. By 1920 the relative volumes of manufactured gas from different sources were as shown in Table 2.

TABLE 2.—*Volumes of Manufactured Gas from the Different Sources, U.S.A.*, 1920.

—	Annual Production in Mn. Cu.Ft.
1	2
C.W.G. manufactured	212,000
Coal gas manufactured	66,000
Coke oven gas purchased . . .	28,000

Since 1920 the position has been somewhat modified; there has been an increase in the utilization of surplus coke oven gas, greater volumes of gas have been manufactured on gas works in by-product ovens, heavy oils and bituminous coal have come into use in water gas manufacture, and there have been considerable developments in the distribution of natural gas.

The utilization of surplus coke oven gas has taken place during the last ten years and the figures in column 5 of Table 3 show that the magnitude of this development relative to other sources of manufactured gas has been considerable.

It will be noted that in 1930 the volume of coke oven gas purchased was greater than the combined totals of the retort and oven gas manufactured by the gas companies themselves.

The figures in Table 3 also indicate the growth of the use of coke ovens as a carbonizing plant on gas works.

TABLE 3.—*Recent Development in U.S.A. in the Use of Surplus Coke Oven Gas.*

[Figures in 1000 Mn. Cu.Ft.]

Year.	C.W.G. Manufactured	Coal Gas Manufactured by Gas Companies.		Coke Oven Gas Purchased.
		Retorts.	Ovens.	
1	2	3	4	5
1920 . .	212	58	8	28
1924 . .	237	51	9	63
1928 . .	240	51	39	97
1930 . .	214	44	52	122

This has been favoured by the high price of labour in the U.S.A., coupled with increasing outlets for a dense coke as a domestic fuel, rather than by any major development in carbonization technique, which indeed appears to follow closely European practice. On the other hand, in the case of water gas manufacture, recent economic changes have resulted in developments which have made this process, as practised in some parts of America, one of extraordinary flexibility.

The developments in water gas manufacture have arisen mainly from the use of heavy oils for carburetting. Up to 1930 the oils used were mostly the heavier fractions of petroleum known as gas oil, similar to that employed in this country. Before that date, however, scarcity of supply of gas oils had been threatened, and prices had risen as a result of the great increase in the demand for petrol, the increase having been met, in part, by resort to cracking. American gas manufacturers were aware of the undesirability of their main gas-making process being dependent upon an oil, the price of which fluctuated with the petrol market, and they commenced experiments to find methods of using the still heavier fractions sold as fuel oil which are available at a price governed largely by that of coal. The success of these experiments led to a complete change in the technique of water gas manufacture in some districts where the relative prices of coke and heavy oil are such that, in gas-making, it is more economical to save coke at the expense of oil. This position is the reverse of that holding in this country and in other parts of America. The methods of operation with heavy oils are described in a later section, together with other modifications which their use has permitted.

A further important development in American water gas manufacture has been the use of bituminous coal in place of coke as a generator fuel. In certain parts of the United States, *e.g.*, Illinois, there are no local supplies of good coking coals, and in order to use coke for water gas manufacture high freightage costs on either coal or coke are incurred. In such cases the possibility of using local low-priced high volatile coals as generator fuel is very attractive financially. After a certain amount of experimental work the difficulties accompanying the use of these coals were overcome, and such processes as the Pier process, Reversed Air Blast, &c., were evolved. These processes will be referred to again as being a main feature of modern American water gas practice, although, on the Visit, we did not visit a works in which bituminous coal was being used. At Chicago local conditions were such that the economic advantage was not sufficiently great to warrant the use of the more smoky and dirty fuel.

The rapid growth of the distribution of natural gas from the oil fields in the South up to the industrial region has been a further important American development during the last five years. A network of natural gas lines has spread into the Middle West and is reaching eastwards towards the seaboard cities. There exists a difference of opinion as to how far this network will extend and also as to its influence on the future of the manufactured gas industry. The present position appears to be that the use of natural gas is a more attractive proposition in the Middle West than in the states bordering on the east coast. The Middle West is nearer the natural gas fields, while gas-making coals are dearer and freightage charges operate against the transport of cheap heavy oils into that region; in addition, the position of manufactured gas in New England is strengthened by a good demand for domestic coke.

It was not possible during our brief stay in America to reach a decision with regard to the ultimate relative development of natural and manufactured gas. The question is a complicated one influenced by economic, geographical, and financial considerations which vary markedly in different parts of the United States. In the writer's opinion, however, one thing is clear, namely, that America possesses in natural gas a very valuable natural resource which she will use as far as is economically possible. During the past five years there has been a rapid expansion in the area covered by the natural gas lines, and this has been reflected by a diminished activity on the manufactured gas side of the industry. At present in America there is a surplus of gas supplies from one source or other, and their main problem at the moment is to find outlets for the surplus gas. As would be expected, while this problem is being overcome, very little new manufacturing plant is being installed.

Greatest optimism for the future of natural gas is found in those districts where supplies of it are already available, and where, as a result of its sale at a competitive price in markets closed to manufactured gas, there is considerable activity. The price of natural gas at its source is very low, 3 to 4 cents per 1,000 cu.ft. The main part of its cost in a city situated, like Chicago, 1,000 miles from the natural gas fields, lies in the capital charges of the pipe line. It is estimated that the overall transport charge amounts to 4 cents per 1,000 cu.ft. per 100 miles.

In view of this distribution cost the opinion has been advanced that in certain cases the most economic procedure will be to use natural gas to take the base load throughout the year, using manufactured gas for the peak loads. This may be the ultimate position when the capacity of the gas lines is reached. In the meantime experiments have been made on the feasibility of preparing in carburetted water gas sets, rich gases which can be supplied satisfactorily to appliances adjusted to burn natural gas. These experiments were also made so that existing plant could be brought into use in case of breakdown of the pipe lines.

In many cases works situated within the natural gas network are also under contract to use surplus coke-oven or oil refining gases. In these circumstances, the flexibility conferred upon the water gas process from recently introduced modifications such as heavy oiling, blow-run, &c., makes the process especially suited to control the quality of the mixture of gases obtained from the various sources. Considerable attention has been given to the mixing of these different gases.

It was stated in America that the next major development in the Natural Gas Industry would be the linking up of the various lines and cities with one another to standardize the quality, composition, and price of gas over large areas. This would extend the use of gas in smaller towns and would generally simplify the supply and manufacture of appliances. At present there are such variations as the following:—

Cleveland, with gas of 1,175 B.Th.U. per cu.ft., at 57 cents per 1,000 cu.ft.—*i.e.*, 4·85 cents per therm.

Geneva, with gas of 550 B.Th.U. per cu.ft., at 82·5 cents per 1,000 cu.ft.—*i.e.*, 15·0 cents per therm.

No definite estimates were obtained with regard to the extent of the natural gas resources. They are, however, sufficient to supply the demand for many years to come.

Reference has been made to the increasing use of coke as a domestic fuel. In the past, bituminous and anthracite coals were used almost exclusively for domestic heating. The prejudice in favour of anthracite has never been so strong in the United States as it used to be in Canada, and the cheaper bituminous coal has always been the

more popular fuel. Anthracite, however, found a market among certain classes of the community who were prepared to pay for its greater convenience and cleanliness, but it is now losing this market owing to its increasing price and discontinuities in supply caused by strikes at the coalfields. The result is that coke and oil are now successfully competing as smokeless domestic fuels. Along the eastern seaboard, oil can be delivered cheaply by water and is being extensively used. It is, however, still dearer than coke which, on this basis, can compete against the greater convenience of the oil. For domestic purposes by-product coke commands a higher price than retort coke, which accounts for the increased use of coke-oven plant already mentioned.

In America there is very little competition between gas and electricity, each being more or less confined to recognized fields of utility. The Gas Industry does not consider competition for lighting a practical proposition, but holds more or less unchallenged the cooking and hot water loads and is expanding rapidly in the central heating field. The region where competition is probably most severe is in the Pacific North-West where there is a surplus of hydro-electricity.

(2) Recent Progress in American Water Gas Manufacture.

Since 1925 development on the mechanical side has largely been connected with the successful design of self-clinkering grates and automatic operation. Conditions in America were particularly favourable for these advances. Water gas was used largely to supply the base load, and hence a greater expenditure of capital was warranted upon devices for the saving of labour and increase of efficiency. Moreover, owing to the nature of the ashes of some American cokes, clinkering generators by hand was occasionally an exceptionally arduous task and, as a result of the high price of labour, a costly one.

Self-Clinkering Grates.

In America the two most common designs of self-clinkering grate are that of the United Gas Improvements Company, the U.G.I., and that sponsored by the Western Gas Construction Company, the A.B.C. Both these designs differ from that of Humphreys & Glasgow, Limited, in that they are not water-sealed. Water-sealed grates have proved quite satisfactory when used with limited blast pressures, but difficulties of ash extraction are encountered when high blast pressures, requiring deep seals, are employed. In America, the nature of the cokes has favoured the use of high blast pressures which have required some different arrangement in place of the water seal. Thus, the American self-clinkering generator has a gastight base, independent of seals, and the refuse is not ejected outside the generator, but into pockets which are integral with the generator casing. These pockets are emptied periodically without interrupting gas-making.

Apart from this common characteristic, the U.G.I. and A.B.C. grates are quite different. The U.G.I. grate consists of a cone-shaped structure mounted centrally on a rotating bed-plate, the bed-plate being provided with vanes which collect and push the refuse into the ash pockets. The successful operation of a grate of this type depends on the non-adhesion of clinker to the walls of the generator. As with Humphreys & Glasgow Ltd.'s grate, the revolving base does little to dislodge clinker in the upper portion of the fire, and, in order to avoid difficulties arising from such adhesion of clinker, the walls of generators equipped with U.G.I. grates are water-cooled in that portion surrounding the fuel bed. The A.B.C. grate consists of a specially shaped breaker beam revolving over a fixed slotted grate. The movement of the beam assists the ash to fall through the grate into a gas-tight container beneath, while the shape of the beam is such that large clinker is pushed outwards and crushed against a water cooled crusher ring. This ring is much shallower than the water jacket round the U.G.I. generator. It surrounds the generator only to the depth of the revolving beam and does not extend upwards into the region surrounding the fuel bed. Consequently the amount of heat abstracted from the generator by the cooling water is less than with the U.G.I. system and, in this respect, the A.B.C. grate is at an advantage.

Above the crusher ring the lining of the Western generator is of firebrick. It is claimed that the adhesion of clinker to the upper walls of the generator is prevented by the motion given to the fire by the revolutions of the beam and by the use of a proper amount of down steam. Sufficient down steam is used to maintain the clinkering zone in the region just above the grate. In this region clinker does adhere to the lining, but, by suitable adjustment of the steam supplies, the temperature is maintained sufficiently high to prevent the clinker accumulating. In this way a skin of clinker 4-6 inches thick is maintained on the lining where, it is claimed, it has a protective action.

In some cases it has been found that by proper regulation of conditions the formation of large clinker was avoided, and that the water cooled crusher ring could be dispensed with, so avoiding all water cooling on the walls of the generator. This method of operating the A.B.C. grate probably depends on the use of cokes with ashes of suitable fusing point.

From consideration of the method of working of the two grates, one would expect that the U.G.I. design with the generator walls water cooled would be more certain to avoid clinker troubles under varying conditions of coke quality and also the A.B.C. grate appeared to be working under more severe conditions of temperature. On the other hand, the use of the A.B.C. grate resulted in less cooling of the fuel bed, and, in the event of failure, it was more accessible for repair.

The writer could not obtain any opinions as to the relative reliability and merits of the two grates except with regard to the cooling action of the U.G.I. water jacket. Both grates appeared to give satisfaction in their ability to extract refuse accompanied by a minimum of unburnt carbon. It was not possible to estimate the increase in coke consumption, due to the water jacket, from the data given at the different works.

Automatic Operators.

Examples of the U.G.I. automatic operator and of two types sponsored by the Western Gas Construction Company were seen.

The U.G.I. Operator.—The U.G.I. operator is designed on the same principle as that of Humphreys & Glasgow, Limited. Cams, rotated by a constant speed motor, controlled pilot valves which hydraulically operated the master valves of hydraulic cylinders mounted on each of the valves of the set.

The Western G.C.Co. Operators.—One of the two types of Western controls was of simple design, and consisted of a large hydraulic cylinder with ports at calculated distances along its length. The ports were opened and closed to hydraulic pressure by a piston reciprocating in the cylinder, one stroke per gas-making cycle. There were connections from the ports to the master valves of the hydraulic cylinders on the valves of the set. The timing of the cycle depended upon the relative position of the ports in the cylinder wall, but some variation could be obtained by the adjustment of needle valves in the passages from the ports to the master valves.

The second type of Western apparatus was of a more elaborate nature. In this design the various hydraulic valves were operated by a system of chains and sprockets, a method which permitted exact timing of the cycle. For this reason the second type of operator was more suitable for the synchronous working of a number of sets. Another feature of this control was the ease with which any valve could be re-timed, if necessary, without interrupting the working of the set. The ease with which the cycle can be modified is especially important where water gas is being prepared as an auxiliary to supplies of natural, refinery, and coke oven gases, and where, as a result, wide variations in gas quality may be demanded at frequent intervals. This type of controller was used at Baltimore under such conditions.

Features of American Water-Gas Practice.

Mention has already been made of certain methods in American practice which have been developed under economic conditions which do not exist in this country, but, apart from such methods, there are certain features which are claimed to lead to higher efficiencies than are general over here. These features depend on (*a*) the nature of the coke used, (*b*) the use of exhaust steam for gas-making, and (*c*) more careful control of the carbon monoxide in the waste gases.

(*a*) *The Nature of the Coke Used.*

The nature of the coke is probably the most important of these three items. In America, the coke used is, almost without exception, dense by-product oven coke and often has ash of high melting point. Coke of this nature permits the use of high blast pressures and a higher percentage of back-run steam.

American experience has been that higher blast pressures, in addition to increasing the make of gas, give higher efficiency as a result of, firstly, a greater percentage of carbon dioxide in the blow gases, and, secondly, a reduction in the proportion of heat lost by radiation or to the water jacket consequent upon the increase in output.

The higher percentage of back-run steam increases the

efficiency by returning a greater amount of heat to the generator. It is quite common to use 60 per cent. of the total steam on the back-run, compared with the 30-40 per cent. used in this country. The percentage of back-run steam is determined mainly by considerations of clinker formation, the upper limit being reached when the clinker forming zone has been driven down to grate level. The high percentages of back-run steam used in America depend on the use of coke having ash of high fusing point.

(*b*) *The Use of Exhaust Steam for Gas Making.*

When high pressure blasts are used, the steam consumption of the turbo-blower becomes considerable and increases the desirability of avoiding the loss of exhaust steam by using it for gas making. On any one set most of this steam is made available during the blow, but when a number of sets are working together, with some "blowing" while others are "steaming," the supply of and demand for steam is more continuous, and it becomes feasible to collect the exhaust steam and supply it to the generators. It is customary to include an accumulator in the system to smooth out fluctuations in pressure.

Such a system was seen in operation at Philadelphia. Its success appears to depend largely on the water gas installation being of considerable size, and operation being sufficiently continuous to warrant the extra capital required for the additional appliances, larger mains, etc.

(*c*) *More Careful Control of the Carbon Monoxide in the Waste Gases.*

It is quite normal in American practice to keep a careful watch on the amount of carbon monoxide in the waste gases. This is probably due to the comparatively high calorific values of the carburetted water gas prepared. As a consequence of this, the heat requirements of carburettor and superheater will, in many cases, be the factor governing the blasting of the generator, and inefficient utilization of the heat of the blow gases would rapidly make itself felt on performance. On some of the works visited, determinations of the combustible gases escaping up the stack were made as a matter of routine.

At the different works, generator coke consumptions were variously stated as being from 25-27 lb. of gross coke per 1,000 cu.ft. carburetted water gas (500 B.Th.U. per cu.ft.). These figures show very efficient working.

As far as the writer could ascertain, the main reasons for the low coke consumptions on plants which were operated on similar methods to those used in this country were:—

(1) The high percentage of steam used on the back-run.

(2) The absence of the annular boiler on the automatic sets of the Western Gas Construction Co. and the low performance of the boiler on U.G.I. sets. In the latter case 15-20 lb. was given as the amount of steam raised per 1,000 cu.ft. of C.W.G.

It was difficult to obtain an accurate estimate of the efficiency of blowing; percentages of carbon dioxide in the blow gases were quoted as being from 14-15 per cent.

Circumstances which have Directed the Development of Water Gas Manufacture in America along different lines from those followed in this Country.

The circumstances which led to the desirability of using heavy oils have been given previously. There were certain difficulties to be overcome in the use of these oils, but these difficulties did not prove unsurmountable and a satisfactory operating technique has been evolved. The importance of this success lay not merely in removing the dependence upon gas oil as an enricher, since there are districts in the United States where the heavy oils are available at a lower price than coke. In such localities this new development completely changed the aspect of water gas manufacture and made it more economical to reduce the consumption of coke at the expense of that of the oil by such means as increasing the percentage of inerts in the blue gas, or by passing oil through the fuel bed and using the carbon thus made available as generator fuel.

The main difficulties encountered in using heavy oil as an enricher were:—

(1) When sprayed into the carburettor in the normal way it deposited a large amount of carbon on the chequer bricks.

(2) Many of the oils were of high sulphur content and produced gas containing excessive amounts of carbon bi-sulphide.

(3) Owing to the incomplete evaporation of the oils during the run the stack gases were smoky.

The first two difficulties were overcome simultaneously. If a special secondary air blow were used to burn off the deposited carbon, it was found that the procedure also led to a considerable reduction in the carbon bisulphide content of the gas. Blowing the carburettor in this way was the first successful method of operating with heavy oils. It did not, however, eliminate the smoky stack.

A second method was to employ a chequerless carburettor so that the carbon deposits would collect at the bottom of the chamber whence they could be readily removed. When using a chequerless carburettor the evaporation of the oil depends upon radiation from the walls. The process was found to be satisfactory when the calorific value of the gas, and hence the amount of oil to be vaporized, was limited. It is customary to equip a chequerless carburettor with a combustion arch. This consists of brickwork in the path of the blow gas and secondary air to assist the mixing and ignition of these gases during the blow period.

The marginal blast process is a third method of using heavy oils. In this case the oil is sprayed, not into the carburettor, but on to the surface of the fuel bed. The residue from the evaporation of the oil remains in the generator, and is used in the blue gas reactions. If the amount of enriching oil required is limited, the sensible heat in the upper layers of the fuel bed is sufficient to evaporate it, but, to permit the use of larger amounts of oil, a special blast is admitted through ports on the side of the generator, approximately one foot below the surface of the fuel bed. In this way an additional amount of heat is made available.

The use of the reversed air blast is a fourth method of operating with heavy oils. In this method the normal blow, during which air is passed upwards through the generator, is cut short and is followed by a period during which the air is supplied to the top of the superheater, passes backward through the cracking chambers when it burns off the deposited carbon, and finally enters the top of the generator in a highly preheated state. In addition to cleaning the chequerwork in the carburettor and superheater, the reversed air blast:

(*a*) Increases the efficiency of gas-making by returning heat to the generator.

(*b*) Allows the carburettor to be chequered in the usual way, and so to retain its full oil evaporating capacity.

(*c*) Gives a high temperature at the top of the fuel bed and so permits a portion of the enriching oil to be injected at this point, reducing the duty on the carburettor chequerwork.

(*d*) Results in a more even distribution of temperature throughout the depth of the fuel bed. As a result of the reduction of the up-blow, excessive temperatures at the base of the generator are avoided, and it is claimed that, as a consequence, clinker formation occurs to a less extent.

The reversed air blast often follows the up-blow and is carried out with a lower rate of air supply. When this is the case the producer gas formed is rich in carbon monoxide, and it is customary to include all or part of it in the make gases. The producer gas does, however, contain approximately 70 per cent. of nitrogen, and its inclusion increases both the specific gravity and the percentage of inerts in the carburetted water gas. This is not a serious disadvantage if the price of heavy oil is low. The inclusion of the producer gas reduces the coke consumption per 1,000 cu.ft. of final gas; the calorific value, lowered by the inerts, can be restored by injecting more oil during the up-run, while the increase in specific gravity can be counter-balanced by the introduction of oil during the back-run, according to a method described in the following paragraphs.

Water Gas of Low Gravity.

There are numerous circumstances in which the ability to produce water gas of low specific gravity is desirable. These include:—

(1) The use of water gas as an auxiliary to coal or coke-oven gas, the latter supplying the base load. The ability to reduce the specific gravity of the carburetted water gas at the peak load permits a wider variation in the proportion of water gas admixed, without affecting the specific gravity of the final gas.

(2) The full advantages of the reversed air blast process for using heavy oils are only obtained when the downward blast gases are included in the make gas, and it is an advantage to be able to counteract the consequent increase in specific gravity.

(3) When a water gas plant is used as an auxiliary to

control varying supplies of natural gas, refinery gas and coke-oven gas, all of which differ in specific gravity as well as in calorific value,[2] an increase in flexibility is obtained if the specific gravity of the water gas can be modified as required. An increase in specific gravity is readily obtained by the use of a blow-run or the inclusion of reversed air blast gases. In certain circumstances, however, *e.g.*, when the coke oven gas supply is low, it is desirable to be able to prepare water gas of low specific gravity.

A method which has been successfully developed to produce water gas of low specific gravity consists in spraying oil into the top of either the superheater, carburettor, or generator during the back-run. The oil is vaporized and passes through the fuel bed with the steam. Here, it is decomposed largely to carbon and hydrogen, the carbon remaining in the fuel bed where it is used for blue gas production, the hydrogen passing forward with the blue gas and lowering its specific gravity. Either gas oil or heavy oil can be used in this process. When using gas oil injection is usually at the top of the superheater, when using heavy oil at the carburettor or generator. Oil used in this way has very little enriching power. The calorific value of the back-run blue gas varies from 360-380 B.Th.U. when two gallons of oil are being passed through the bed per 1,000 cu.ft. of total water gas made.

The chief difficulties encountered in the development of this method of operation were caused by the clogging of the fire with deposited carbon leading to uneven blast distribution, and by the carrying forward of sooty material as a suspension in the back-run blue gas. In addition to the loss of the heat of combustion of the suspended material, troubles arose due to stoppages on the plant and the formation of tar emulsions. These difficulties have been overcome, apparently by limitation and careful regulation of the supply of the oil, and it has been found possible to prepare satisfactorily a gas of 500 B.Th.U. per cu.ft. of specific gravity 0·55 using approximately 4 gallons of oil and 12-15 lb. of coke per 1,000 cu.ft. of C.W.G.

In the foregoing remarks this process has been regarded primarily from the point of view of producing a water gas of low specific gravity. It was with this aim that the process was developed. It is, however, of considerable value when used, in combination with the Reversed Air Blast process for heavy oils, to produce a carburetted water gas of normal specific gravity. In those areas of the United States where heavy oil is available at lower prices than coke, this combination of processes has the following advantages over normal methods of operation: firstly, the price of raw material per 1,000 cu.ft. is less, the increased oil consumption being outweighed by the saving in coke, and, secondly, the capacity of the plant is considerably increased.

In the course of the Visit there were opportunities of seeing in operation all these methods of using heavy oils and of controlling the specific gravity of water gas used either alone or in combination with one another to suit local circumstances. They leave a lasting impression of the flexibility of water gas manufacture under certain American conditions.

The Use of Bituminous Coal as Generator Fuel.

For reasons already given, the use of weakly coking bituminous coals has been a recent major development in American water gas practice. When these coals were supplied to a water gas plant of normal design and operated as when using coke, the following difficulties arose:—

(1) Owing to the friability and coking properties of the fuel, active combustion and gasification could not be maintained in the centre of the fire, and, for this reason, the efficiency and capacity of the set fell considerably.
(2) It was not possible to utilize in the carburettor and superheater all the gases and vapours distilled from the coal during the blow period, and, with conditions of incomplete combustion, the stack gases were very smoky. (This difficulty could not be overcome apparently by the use of tertiary air.)
(3) The fines in the coal blew over into the carburettor, clogging the chequerwork.

The first difficulty was overcome by the Pier Process in which a refractory column was built in the centre of the generator. This column replaced the black centre of the fire, and it was found possible to maintain an even distribution of air and steam across the annular fuel bed surrounding it.

The blow-run was used to surmount the second difficulty. In this method of operation, procedure is normal at the commencement of the blow except that special attention is given to the complete combustion of the blow gas, including the coal gas and vapours which accompany it. The combustion takes place in the carburettor and superheater to which secondary air is supplied, and the amount of smoke escaping at the stack is greatly reduced. Owing to the richness of the blow gases, the carburettor and superheater attain the temperature necessary for oil cracking before sufficient heat has been stored in the generator. When this stage has been reached the secondary air supply is shut off and the stack valve closed. Blowing then continues until the heat requirements of the generator have been met, the blow gases produced during this period passing forward to the wash-box and mixing with the make gases. It is this second stage of the blow which is referred to as the "blow-run."

The "blow-run" increases the specific gravity of the water gas to an extent depending on the amount of blow-run used. The gravity is not as high as that of gas prepared from coke under otherwise similar conditions, but it may be noted that, when using coal, the fire is more readily clogged and the normal specific gravity cannot be restored by injecting oil into the fire during the back-run. Oil has been successfully injected, however, when using a 50 per cent. mixture of coal and coke.

From this brief description of operation with "blow-run" it follows that the same object can be achieved by using a reversed air blast in cases where the plants are equipped for this system of working.

To overcome the third difficulty encountered when using bituminous coals, namely, the clogging of the chequerwork by material blown over from the generator, one or more of the following expedients have been adopted:—

(*a*) The coal is carefully screened before use.
(*b*) A dust catcher is inserted between generator and carburettor.
(*c*) The use of chequerless carburettors or chequers arranged according to the flue system, permitting easy removal of any deposited material.
(*d*) Lower blast pressures are used.

The back-run process was introduced initially as being specially advantageous for the use of bituminous coal as generator fuel. The coal was introduced immediately before the back-run commenced, the exposure to the highly superheated steam aiding its more complete distillation during the run period. Any advantages which back-run steaming possesses in this respect have been overshadowed, however, by its advantages in other directions, and it can now be regarded as the standard method of steaming with all fuels.

The American aim in using bituminous coal as a generator fuel is quite different from that of complete gasification as known in this country. In America, the use of bituminous coal is due to the fact that, in certain localities, carbon is cheaper in this form than as coke, altogether apart from considerations of the volatile matter in the coal. In developing the use of coal in a water gas generator the American problem was mainly the solution of mechanical difficulties attending the process. The possibility of recovering the volatile matter in the make gas was not lost sight of, but was regarded as of secondary importance. In England, where coal is not a cheaper source of carbon than coke, and where the price of enriching oil is relatively high, the problem of complete gasification is entirely different. Its success in this country depends largely on recovering the valuable distillation products of the coal.

Of the various processes which have been developed under American conditions the one which appears most likely to be of use here is that for the preparation of water gas of low gravity, which enables the proportion of water gas in admixture with coal gas to be considerably increased without alteration to the specific gravity of the final gas. Under our conditions, the cost of the raw materials in this process would be high. Its use would depend upon how far it would prove to be a more economical method of meeting emergency demands for gas than by holding in reserve retort settings under slow fires.

Re-forming Natural Gas.

The ways in which a water gas plant is used to control mixtures of varying supplies of coke oven, natural, and refinery gases have already been outlined. There is an alternative method for use if large quantities of rich gas are available when the demand for gas is insufficient to permit dilution with water gas. The alternative procedure is to "re-form" all or part of the natural or refinery gas.

The process of re-forming carried out to change the calorific value, specific gravity or combustion characteris-

[2] Typical specific gravities and calorific values are:—

Coke oven gas . .	0·385;	585 B.Th.U./cu.ft.
Natural gas . . .	0·575;	1,000 B.Th.U./cu.ft.
Refinery gas . .	1·000;	1,600 B.Th.U./cu.ft.

tics of natural or oil-refinery gases, is a process which varies considerably in operating detail, according to the circumstances which make the change desirable. Briefly, its application results in the conversion of higher hydrocarbons to methane or carbon and hydrogen.

The process consists essentially in passing the gas to be re-formed through the chambers of a water gas set during the steaming period. According to the degree of decomposition required, the gas flows through generator, carburettor, and superheater, or only through carburettor and superheater. Usually, the temperatures throughout the set are considerably below those existing when water gas is being prepared.

As an example, at Chicago, natural gas was being reformed to produce a gas which could replace or augment the coke-oven gas normally contained in the mixture distributed.

(3) The Surface Combustion Corporation, Toledo.

At the works of the Surface Combustion Corporation at Toledo, the writer's attention was called to a new development in burner design, viz., the diffusion burner. The special feature of the burner was its ability to produce a long and stable flame, and it was particularly suited to maintaining a uniform temperature throughout a furnace of considerable length.

The diffusion burner is based on the discovery that, when combustion occurs between parallel streams of gas and air, moving at the same velocity under streamline conditions, the two streams do not mix, and combustion and flame are confined to the interface. The rate of combustion is controlled by the rate of molecular diffusion across the interlace. Theoretically, if the air and gas are present in equivalent proportions, the flame would be of infinite length, but in practice the flame length can be controlled by using a regulated excess of air.

A diffusion burner was seen fitted to a furnace which was in the shape of a horizontal tunnel, approximately 20 ft. long by 2 ft. square, the diffusion burner completely filling one end of it. The surface of the burner had the appearance of a large honeycomb but really consisted of a number of tubes of $\frac{3}{4}$ in. diameter laid side by side and pointing into the furnace. Some of these tubes were connected to a gas supply, and the remainder to an air supply, it being arranged that each gas tube was completely surrounded by air tubes.

Unfortunately the furnace was not alight at the time of the writer's visit, but it was stated that, in use, the flame was quite steady and appeared like a number of incandescent rods coming out, one from each gas tube, and traversing the length of the furnace. The incandescence is caused by the cracking of the hydrocarbons in the gas stream before they diffuse into the flame front, and, as might be anticipated, the radiation from the flames was higher when the gas used was rich in hydrocarbons, *e.g.*, natural gas. Manufactured gas had, however, been used satisfactorily.

It was claimed that, using natural gas, the radiation from the flames amounted to 60 per cent. of the radiation from a black body of similar dimensions and at the same temperature.

Preheated air can be employed without influencing the stability of the flames, and, hence, when using this type of burner, heat can be recuperated from the products of combustion.

In order that the streamline flow of air and gas shall not be disturbed, it is necessary that the charge to be heated presents a comparatively flat surface on the floor of the furnace.

Investigations were in progress with the diffusion burner on the possibility of using it to maintain a reducing atmosphere in contact with the furnace charge. Some success had been obtained in this direction by supplying gas to all of the tubes in the lower two or three rows of the burner; normal combustion occurred from the remaining tubes, while the " atmosphere " streamlined across the floor of the furnace.

(4) The Research and Testing Laboratories of the American Gas Association.

In contrast to the position in this country the manufacture of gas appliances in America is in the hands of some 850 concerns. It had been realized for some time that the keen competition existing between such establishments led to the practice of price cutting, and as a consequence the design and construction of some of the appliances manufactured were not all that could be desired. The need for some practical solution for this problem had been recognized by the gas industry of America for many years, and as early as 1915 one of the American Gas Association's Committees formed to consider this subject had recommended the establishment of a central and impartial testing agency. The World War, however, prevented early consummation of such plans. As a result of the success of testing stations at Los Angeles and Baltimore, in 1924 the gas industry definitely decided to go ahead with previously arranged plans. R. M. Conner, at that time representing the Pacific Coast Gas Association as Research Engineer of the Los Angeles station, was selected by the American Gas Association to establish a central Testing Laboratory in Cleveland, Ohio. Cleveland was chosen because approximately 85 per cent. of all the gas appliances produced in North America are built within a radius of 500 miles of that city. Another very important consideration influencing its selection was the availability of three different kinds of gases, namely, natural, coal, and carburetted water gas.

Work began in May, 1925, in accommodation provided by the local gas company. Such facilities, however, were very soon outgrown, and in 1928 property was purchased near the original site and a building erected thereon. In 1930 a branch of the main Laboratory was opened in Los Angeles. The total investment in these two establishments up to date has been approximately $500,000.00.

The Laboratory concerns itself largely with utilization problems; investigational work on the manufacture of gas or the utilization of coal, tar, &c., is usually carried on at works or university laboratories. Its main function is to devise and apply specifications for testing gas appliances, although it carries out a great deal of research work on general utilization problems and on some production and distribution problems which arise from time to time. For these reasons the Laboratory's activities are divided into two departments, namely, research and testing.

The Work of the Research Department.

The Research Department is largely responsible for conducting investigational work required during the preparation of test specifications. Each set of such specifications, or requirements, as they are generally designated, is drawn up under the guidance of a sub-committee of the manufacturers of the appliance under consideration, together with an equal number of representatives of the gas companies. The research staff conducts such studies as are assigned by the various committees and reports its conclusions, usually in the form of suggested standards. If considered satisfactory after discussion, the requirements are printed and labelled " For Criticism Only " and circulated throughout the entire membership of the American Gas Association. Criticisms invited at this stage are of a detailed nature pertaining to experimental methods, interpretation of results, wording, &c.

A three months' period is usually allowed for such criticisms, which are submitted through the Association's Headquarters. After being summarized, these comments are then passed on to the interested sub-committees, and only revisions which seem generally desirable are made in the tentative requirements. After these preliminary changes are made, the tentative requirements are submitted to the A.G.A. Approval Requirements Committee, which considers them from a much wider point of view. This group contains among its members representatives of the National Bureau of Standards, U.S. Bureau of Mines, American Home Economics Association, U.S. Bureau of Home Economics, American Institute of Architects, Heating and Piping Contractors National Association, Associated Factory Mutual Fire Insurance Companies, and the Master Plumbers' Association, as well as representatives of the Canadian and American Gas Associations. After final approval by this Committee and the Association's Executive Board, such requirements are submitted to the American Standards Association for adoption, and, if accepted, become American Standards.

From the time such requirements leave the first committee approximately one year is required for them to reach final form, and usually about the same period is allowed after approval by the American Standards Association before such requirements become effective. This gives the manufacturers an opportunity to anticipate the new requirements well in advance of the time they become effective. In this manner American Gas Association requirements have been drawn up for practically all types of domestic gas appliances and a number of different kinds of equipment widely used in the commercial and industrial fields. These standards require annual revision and are being made more rigid from year to year. As a result, the standards of construction and performance are elevated and better types of approved products are thereby insured.

As previously mentioned, the work of the research section also includes investigation of general utilization, production, and distribution problems, and these investigations run concurrently with the revision of test requirements.

Research projects completed or in progress include:—

(*a*) Research on bell and spigot and mechanical joints for cast iron pipe.

(*b*) Research on welded pipe joints. (During the course of this study a Weld Test Meter was devised.)

(*c*) Research on mixed gases. (During this study some 175,000 separate tests made on 250 different kinds of gases.)
(*d*) Elimination of noise in industrial gas burners.
(*e*) Combustion space requirements for the burning of various kinds of gases.
(*f*) Study of principles of recuperation.

The Testing Section.

Approval requirements are applied in the testing section. Manufacturers submit their appliances, and if found satisfactory they are authorized to mark their appliances with the American Gas Association's Laboratory Approval Seal. If appliances successfully pass the tests, no details of such results are given to the manufacturer. However, if they fail, which is usually the case, the manufacturer is advised of the respect in which they fail. In this way the Laboratory brings about marked improvements in the construction and performance of appliances, and it is understood that a great deal of the new developments which have been brought about in such fields in America during the past few years may be largely attributed to this contact.

A complete list of approved appliances is prepared and circulated throughout the membership of the Association every three months and supplementary lists are supplied monthly. In addition to the regular subscribers, large numbers of department stores, gas appliance dealers, &c., receive this information monthly.

Apart from its testing operations, the activities of the testing section also include the inspecton of manufacturers' products at their factories to determine whether the appliances are being maintained at the proper standards. Approximately 500 such inspections are made each year, usually between October 1st and January 1st, some five inspectors being required for this work.

Source of Income of the Testing Department.

Activities of the testing department are supported largely by the appliance manufacturers. The fees charged for such services have been worked out on a cost basis, and the money received from such sources pays for all labour and materials involved and also includes some allowance for depreciation of the buildings and testing equipment. Income from this source averages between $100,000.00 and $150,000.00 per annum. Funds required for research work are supplied by the American Gas Association.

The Staff of the Testing Laboratory.

The staff employed in both Laboratories has been as high as 75. During the past two years, however, the average has been around 50. Men employed in the testing work are all graduate engineers, such professions as chemical, mechanical, and electrical engineering being about equally represented. Approximately one-fifth of the staff is composed of chemists and physicists. This variety in training has been found necessary in view of the many different kinds of problems that are handled. For similar reasons, men are selected from various colleges throughout the different sections of the United States. Inasmuch as both the research and testing departments have a large amount of work of an advisory nature, the present staff at all times contains at least five men who have had long experience in various phases of the gas business. The number of inquiries on special problems of this nature total around 1,000 per year, and for such reasons a relatively large clerical staff is also necessary.

(5) The Coal Research Laboratory at the Carnegie Institute of Technology.

The Coal Research Laboratory at the Carnegie Institute, Pittsburgh, is under the direction of Dr. A. H. Lowry. It was founded four years ago, and is financed by coal users. The aim of the research is accordingly to improve the utilization of coal.

It is considered that further advance in coal utilization is most dependent upon an increase in the knowledge of its constitution, and almost all the experimental work of the laboratory has been planned with this idea in view.

For many years the elucidation of the constitution of coal has engaged the energies of many investigators, and a number of methods of approach have already been evolved, such as solvent extraction, oxidation, fractional distillation, halogenation, &c. The Laboratory at the Carnegie Institute was characterized by the fact that all the methods which have shown promise were being used concurrently with a view to correlating the indications of their results.

Coal was being treated as an organic compound, and analyzed along lines fundamentally similar to those employed in organic laboratories. The various experimental procedures, such as those mentioned above, were considered different only in their severity, and consequently in the degree to which their use broke up the coal molecule.

Time did not permit a detailed discussion of the results which had already been obtained in the laboratory. They are to be published shortly in a series of papers. There was much interesting apparatus on view in the laboratory, which was exceedingly well equipped.

(6) The United States Bureau of Mines.

The work carried out in the various departments of the United States Bureau of Mines could be divided into:—

(*a*) The testing of coals for carbonization purposes. A survey was being made of the gas making and coke making properties of the coals of the Pennsylvanian fields.
(*b*) Experiments on combustion and gasification.
(*c*) Investigations of explosives for use in mines.
(*d*) Electrical work in connection with safety in mines.
(*e*) Mine rescue work.
(*f*) The utilization of natural gas.
(*g*) General analytical work.

Visits were paid to the Departments engaged on (*a*), (*b*), (*f*), and (*g*).

The Testing of Coals for Carbonization Purposes.

The test plant employed for the testing of coals for carbonization purposes had much in common with the modified Corbet-Woodall plant at Leeds, especially as regards the condensing system, the purification system for sulphuretted hydrogen and ammonia and the sampling arrangement for the gas. The chief points of difference were:—

(1) The retort was made of 16 gauge mild steel and was in the form of a vertical cylinder, the base of which was welded on after the coal charge had been admitted.
(2) The retort was heated electrically in a furnace, wound with nichrome ribbon, capable of taking a load of 30 kilowatts but requiring only 4-5 kilowatts to maintain the temperature. The temperature of the retort was automatically controlled. The furnace was large enough to take a retort containing 500 lb. of coal, but, so far, experiments had only been made with 100 and 200 lb. charges. The electrical system of heating appeared very satisfactory. The furnace was compact, readily controlled, and running costs were low.
(3) Between condensers and scrubbers the purification system included an electrostatic tar precipitator of the twin chamber squirrel cage type with three points of discharge and operating on 15,000-30,000 volts. One chamber served as a stand-by for the other in case of failure of insulation.
(4) After leaving the ammonia and sulphuretted hydrogen washers the gas passed to a light oil scrubber through which wash oil, cooled with iced water, was circulated. This scrubber removed only part of the light oil. The remainder was condensed by passing the gas through a freezing mixture of acetone and carbon dioxide snow (− 77° C.). When an experiment was completed the freezing mixture was removed and the condensate allowed to attain atmospheric temperature, any gas evolved passing forward to the gasholder.
(5) The determination of gas density by an effusiometer was found to be inaccurate for purposes of constructing weight balances. Use was made of a commercial instrument which could be checked against an Edward's balance, or, alternatively, the density was determined directly using a 500 c.c. flask.

Admirable features of the plant were the method of heating, the control of the temperature, and the method of collecting the tar.

Combustion and Gasification Laboratory.

The problem receiving primary attention in the Combustion and Gasification Laboratory was a study of the factors affecting clinker formation in domestic boilers. These factors included:—

(1) The fusion temperature of the ash as determined by different methods.
(2) The distribution of the ash in the fuel.
(3) The rate of combustion of the fuel in the boiler.
(4) The use of preheated air.

When complete, this work will be very valuable; interesting results are being obtained.

The differences in the figures obtained for the fusion temperature of ash by the use of various standard methods

have been shown by series of determinations on 50 or more samples of ash.

It has been found that there is no close relationship between the fusion temperature of ash as determined by any standard method and the amount of clinker formed in practice under given conditions of air supply, &c. Clinker formation depends, in addition, on the distribution and amount of the ash in the fuel, the size and properties of the fuel, &c.

From the viewpoint of clinker formation, the usual methods of determining ash fusion temperatures have an inherent disadvantage in that the different constituents of the ash are finely crushed and brought into intimate contact in a comparatively homogeneous mixture, a condition different from that in which they exist in the fuel. A further complication arises in that ashes do not show a definite melting point but become fluid gradually over a range of temperature. The extent of this temperature range varies with different ashes and thereby increases the difficulty of correlating results. The Bureau of Mines is attacking these problems in a very systematic way.

The work has already indicated the importance of the time factor in clinker formation. In tests on a domestic central heating boiler, it has been shown that, within limits, a reduction in the rate of combustion increases the amount of clinker formed per day. This was explained as being due to the influence of the longer time which the ash spent in the hot zone of the furnace at the lower rates of combustion more than counterbalancing the effect of the higher temperatures which existed in the fuel bed with the higher rates.

The previous remarks apply to the results of different tests, in any one of which the rate of combustion was constant throughout. Further tests showed, however, that the conditions which were most conducive to clinker formation were those in which the rate of combustion was suddenly reduced, *e.g.*, if the dampers of a furnace which had been working at full output were practically closed, the ash remained for some time at a high temperature and formed large clinker. Such sudden alteration to damper settings is often the customary procedure in banking up furnaces at night. The tests bear out the experience that less clinker trouble arises if the furnaces are controlled more gradually by means of automatic devices.

Other tests on the domestic boiler were being made to show the influence of the collection of soot on the inner surface.

The work of the laboratory also included an investigation of the slagging of coal ash. With certain American coals a slagging pulverized fuel furnace works steadily at full load, but under reduced output conditions the lower temperature in the combustion chamber may be insufficient to keep the slag fluid. Experiments were being carried out to find materials which would slag the ash if added to the combustion chamber when the trouble occurred. The procedure employed was to heat ashes in the hearth of a furnace to a definite temperature and then to add various slagging agents (alkalies, lime, iron, readily fusible clays, &c.). In this way the most suitable agent for a particular ash was determined. Some of the agents proved unsatisfactory since they did not mix readily with the slag but merely floated on the surface. The investigations on coal ash also included a study of the viscosity of slags at different temperatures.

The Utilization of Natural Gas.

Experiments on the conversion of natural gas to products of higher value such as acetylene, ethylene, and polymerized products had been commenced with the aim of finding uses for the surplus capacity of the natural gas pipe lines which are not yet working at full load.

The thermal decomposition of methane, the major constituent of natural gas, had been studied under conditions in which the methane, contained in a bulb, was exposed to an incandescent filament. The bulb was immersed in a cooling medium to condense out the products and so remove them from the sphere of the reaction. It was assmed that the lower the temperature of the cooling medium the more primary were the decomposition products obtained. Thus:—

Cooling Medium.	Products.
Liquid nitrogen	Ethane
Carbon dioxide snow	Ethylene and acetylene
Atmospheric temperature . .	Carbon and hydrogen

In experiments where the methane was diluted with carbon dioxide and water vapour, 10 per cent. of it was obtained as acetylene.

From the point of view of the disposal of natural gas, the results of the experiments made so far were not promising. At present the difficulty of using surplus natural gas is increased by the fact that, usually, in districts supplied with natural gas, the price of oil is low.

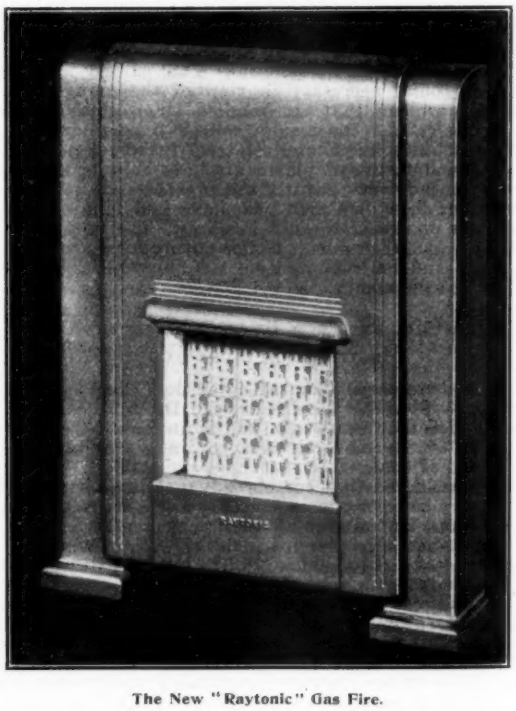
An Artistic New Gas Fire.

A new gas fire, which is somewhat revolutionary in design and principle, has recently been evolved by the Raytonic Heating Company, Ltd., of 176, Windsor House, Victoria Street, S.W. 1, and after a considerable period of research and experimental work this appliance may shortly be expected on the market.

This fire, which, as our illustration shows, is exceedingly attractive in appearance, embraces all the main principles of applied heat, and affords an elegant and economical method of heating without elaborate or costly installation. Radiation, high and low temperature, reflection, air circulation, and thermal storage are applied in the "Raytonic" fire, whose scientific construction ensures the even distribution and circulation of heat throughout, and, by preventing the concentration of heat in any particular area, gives an efficiency which may be likened to a central heating installation, together with a radiant heating surface. The side columns are adjustable, providing a multi-sized fire, while it is in effect a combined radiator and fire, it being possible to maintain the room's temperature on a lower consumption when the radiant section is not required.

"Raytonic" gas fires are obtainable in a variety of pleasing designs and colours, including old gold, silver, silver blue, and silver green pastel shades, so that it will be readily appreciated that models are available to harmonize with any decoration scheme and form a dignified and artistic addition to any room. The overall dimensions are 2 ft. 5 in. high, 1 ft. 10 in. wide, and 6 in. deep, while the gas consumption is stated to be 15 c.ft. per hour.

It may be mentioned that the Raytonic Heating Company, Ltd., also manufacture a gas radiator somewhat similar to the above in general appearance, the burner in this case being covered with translucent louvres. This, again, is supplied in a variety of colours and makes a very pleasing piece of furniture. These appliances should make a definite appeal on the heating side.



The New "Raytonic" Gas Fire.

North of England Gas Managers' Association

Autumn Meeting at Middlesbrough

The North of England Gas Managers' Association crowded quite a lot into one day when they assembled at Middlesbrough for their Autumn Meeting on Friday, Oct. 5, under the Presidency of Mr. R. H. DUXBURY (Engineer, Manager, and Secretary of the South Bank and Normanby Gas Light and Coke Company).

In the morning they met in quite large numbers at the Grand Hotel, Middlesbrough, when the formal business was transacted, and Mr. Duxbury delivered his Presidential Address. Luncheon followed (also at the Grand Hotel), and immediately afterwards the members left for Billingham (on the north side of the Tees), where they were the guests of Imperial Chemical Industries, Ltd., whose works they visited. The immensity of these works, covering an area of 800 acres, rendered it necessary for them to be conveyed from point to point inside the works area by motor 'buses. The gas-making plant there is being very considerably extended in order to produce the large quantities of gas necessary for hydrogenating coal, which process is to be carried out on a very large scale.

The Meeting.

Colonel H. E. KITCHING extended a welcome to the members, on behalf of his co-Directors of the South Bank and Normanby Company, and expressed their appreciation of the honour which the Association had done Mr. Duxbury by electing him President. They felt, he said, that Mr. Duxbury fully deserved that honour, and it was pleasing that so many had supported him on this occasion by their presence.

On the proposal of the President, the meeting observed a short period of silence as a mark of sympathy and respect for the late Mr. W. Turnbull (son of Mr. Turnbull, of Alnwick).

Apologies for absence were received from Mr. C. Valon Bennett (President of the Institution of Gas Engineers), Mr. F. P. Tarratt (Engineer) and Mr. T. P. Ridley (Secretary and Commercial Manager), of the Newcastle-upon-Tyne and Gateshead Gas Company, Mr. J. H. Race (Farnworth), Mr. J. R. W. Alexander (Secretary of the Institution of Gas Engineers), Colonel S. S. Ogilvie, Mr. E. J. Fottrell and Mr. W. J. Smith (National Gas Council), Mr. W. D. Rowe (Manager, B.C.G.A.), and Mr. C. Bateman (Harrogate).

On the motion of Mr. LEES (Hexham), seconded by Mr. DRU DRURY (Sunderland), Mr. C. Bateman (Harrogate) was elected to membership.

Examinations of the Institution of Gas Engineers.

The PRESIDENT expressed congratulations to the following students, who were successful in the examinations of the Institution of Gas Engineers, and his personal pleasure that one of them was a member of his own staff:

1st Class Higher Grade Gas Engineering.

J. E. McManus . . . . . Newcastle

2nd Class Higher Grade Gas Engineering.

W. A. Briggs . . . . . Newcastle
J. S. Graham . . . . . ,,
P. N. Lee . . . . . Hartlepool
F. J. Webster . . . . . ,,

1st Class Ordinary Grade Gas Engineering.

W. H. B. Porter . . . . . Newcastle
J. Smith . . . . . Workington

2nd Class Ordinary Grade Gas Engineering.

A. E. Holmes . . . . . South Bank
M. C. Nicholson . . . . . Cockermouth

2nd Class Higher Grade Gas Supply.

R. P. Davison . . . . . Newcastle
H. N. Miller . . . . . ,,
K. G. Millican . . . . . ,,

1st Class Ordinary Grade Gas Supply.

J. Carr*. . . . . Newcastle
J. F. Lord . . . . . Darlington
T. R. Mathews . . . . . Newcastle

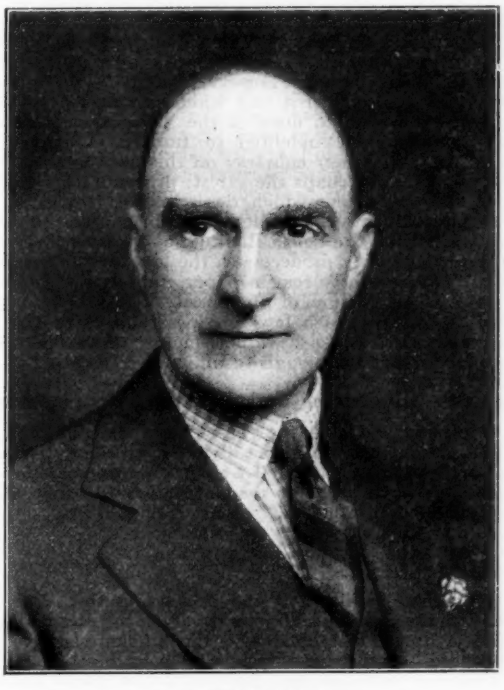
2nd Class Ordinary Grade Gas Supply.

T. J. Paxton . . . . . Newcastle

* With Distinction.

Mr. D. CURRIE (South Shields) said he gathered that the places mentioned in the list were those at which the candidates sat for the examinations, and did not indicate the undertakings to which they belonged. He suggested, therefore, that the names of the candidates' undertakings might be given; two members of his own staff had been successful, and he would like it to be on record that there were clever boys in South Shields!

The PRESIDENT said that Mr. Currie's suggestion would certainly be adopted, and the undertakings would be included in the list as finally published.



THE PRESIDENT,

R. H. DUXBURY, Engineer, Manager, and Secretary of the South Bank and Normanby Gas Company.

Mr. R. H. Duxbury was educated at the Manchester Grammar School, and subsequently served indentures and received technical and general training with the Oldham Corporation Gas Department. He also studied at the Manchester School of Technology, and the Salford Royal Institute, and was awarded the City and Guilds Bronze Medal for Gas Engineering in 1910. He subsequently held official positions at Oldham as Assistant Manager of the Hollinwood Works and Resident Manager of the Central Works. For three and a half years Mr. Duxbury served as Assistant Engineer to Mr. J. H. Brearley, C.E., with the Longwood and Slaithwaite Gas Company, during which time had charge of the erection of an entirely new works on virgin site. For ten years, he was Engineer and Manager of the Batley Corporation Gas Department, prior to being appointed to present position in 1928. Mr. Duxbury has had considerable experience in the erection of new plant, having had charge of the erection and subsequent working of four vertical retort installations on different works. He is of an old "gas" family, eight relatives of the same name having been closely connected with the management of Gas Undertakings. Mr. Duxbury's father was for over twenty-five years Engineer and Manager of the Oldham Corporation Gas Department. He is the fourth member of his family to have been elected President of a District Gas Association.

PRESIDENTIAL ADDRESS

OF

R. H. DUXBURY, Engineer, Manager, and Secretary of the South Bank and Normanby Gas Light and Coke Company.

Gentlemen,—It is with great pleasure that I acknowledge the honour you have conferred upon my Company and myself by electing me President of your Association. My pleasure is increased by the knowledge that I am the fourth member of my family to have had the honour of being elected to the Presidential Chair of either this or the Manchester District Association.

My late uncle, Thomas Duxbury, was President of the Manchester District Association as far back as 1888, and my father in 1908. My cousin, T. H. Duxbury, was your President in 1909, and I now have that honour in 1934. It is my hope that my son who is just entering the gas profession will in time receive a similar honour, and be a worthy member of a worthy profession.

I am sure you will all agree with me when I say, with all due respect, that my position to-day is very much more difficult than that occupied by my predecessors. First, because of the difficult times through which we are passing, owing to industrial and competitive conditions, and, secondly, owing to the difficulty of finding matter which has not already been dealt with in previous presidential addresses. I have, however, been very fortunate in securing for to-day's visit one which I venture to think should prove second to none in the Association's history, and I am extremely indebted to Imperial Chemical Industries, Ltd., for their courtesy on this occasion.

The usual, and perhaps the safest, procedure for a presidential address is one which describes the works of the undertaking which the president has the honour to serve; but as you visited the South Bank Company's works, under the presidency of my predecessor, the late Mr. S. Shadbolt, and as I have recently read a paper embodying a description of a large portion of the plant, I intend to-day to confine my address to a few remarks relative to the Gas Industry, most of which have been made before, but which I consider important enough to allow of reiteration.

General Advertising and Electrical Propaganda.

It is pleasing to note the recent improvement made in national gas advertising generally, and especially with regard to the attitude taken to electrical propaganda. In the past, we have been too ready to allow incorrect statements and innuendos to pass unchallenged; this is particularly true as regards gas appliances.

For instance, "Every Lady in the Land" has been widely informed that:

> "Electric cooking is the cleanest, safest, simplest, and most economical method. With electricity there are no fumes and no smoke; the kitchen remains cool because heat does not escape from an electric cooker. That is economical, too, for you do not waste the heat for which you are paying. Moreover, meat loses less weight when cooked by electricity; in fact, as so many have found, what you save by this lesser shrinkage more than pays for the current you use. Electricity is always consistent and constant. You can rely on the heat being just the same to-day as it was yesterday."

Referring to such eulogy, I cannot do better than quote the contributor of "A Woman's Viewpoint" in the "GAS SALESMAN" of March last, who states:

> "In this one paragraph you find four innuendos reflecting on gas—alleged fumes, the ventilated gas oven, meat shrinkage, and uneven gas pressure. It is just a lot of arrant nonsense—*you* know it is, and *I* know it is, but does 'Every Lady in the Land' know it is? How can she know it unless someone tells her? Who is going to tell her? Certainly not the electricians! Why don't *we* broadcast straightforward, candid answers to the charges that are insinuated against us? Rather than have their admiration of our opposition I would have them asking, 'Why can't the gas people be gentlemen again? Why can't they remain innocuous, ineffective, long-suffering, and purblind as they have been in the past?'"

If the above does not exactly express my own sentiments, it comes near enough for all practical purposes.

Another instance, with which you are already conversant: On the occasion of a Royal visit having for its object the extension of an electrical generating station, there was a hurried installation at the leading hotel of an electric appliance in order that the Royal visitor might have his cutlet grilled electrically. The appliance was removed the day following the ceremony.

The electrical industry undoubtedly obtained a large amount of advertisement from this fact without anything being said by the Gas Industry, except a small note in the Technical Press, which did nothing to enlighten the public generally. This is, of course, very polite, but is it in the interests of the Gas Industry, and should we have received the same treatment under similar circumstances?

Just one other instance. A Yorkshire evening paper, referring recently to an electrical breakdown at Scarborough and Bridlington, stated:

> "Fortunately, in most hotels and boarding houses the lunches had already been cooked and were almost over."

It was left to Mr. Bloor, of York, to point out in the Press that he had reason to believe that in neither Scarborough nor Bridlington is there a single hotel or boarding house which employs electricity for cooking!

I am by no means advocating that the Gas Industry should emulate these methods of advertisement, but I do earnestly suggest that every possible means should be used to prevent the public from being gulled by statements like those referred to.

Gas Charges.

Quite a lot has been said about gas charges in the past, and it is now time that something was being done. We have, on the one hand, part tariffs with low commodity charges; and on the other hand graded scales according to consumption, and rebates according to rateable value, number of rooms, &c. It seems rather unfortunate that the question of gas charges generally has not been dealt with sooner, in a national way. It is realized, of course, that local conditions have to be taken into account, and that different scales would have to be made to meet varying classes of business. At the same time, it would appear that a general basis could have been laid down which would have been of advantage to the Industry generally.

If the question of calorific values had been considered from a national standpoint early enough, there would not be to-day the varied declared calorific values which there are. It might have been necessary to have had two, or perhaps three, but this would have been preferable to the present conditions when there are often four or five undertakings in close proximity, with slightly differing declared values.

It would appear that gas charges are in danger of becoming even more involved than calorific values. It is my opinion that, except for those places where the ordinary selling price is already very low, it is much better to have a block charge at the standard price, and then a considerable reduction on the next block, rather than a gradually reducing scale.

In the case of my own Undertaking, it has not yet been possible to do much, but a start has been made by making a good reduction of 9d. per 1,000 c.ft. after the first block, which is at 4s. per 1,000 c.ft., the reduction on the next block being a further 3d. The first block at the present time is high—viz., 20,000 c.ft. per quarter—but this will undoubtedly be reduced in the future, and I should like to see it in the neighbourhood of 5,000 c.ft. Even so, I am of the opinion that the revised charges have been of much greater advantage to my Company than would have been the case if the reduction had been made on a gradually reducing scale.

Hire Purchase and Simple Hire.

I am definitely in favour of hire purchase, but, at the same time, I am of the opinion that the offering of appliances, especially cookers, on three or even five years' hire purchase, will very soon need reconsideration, and, in order to compete with the electrical industry, the terms of years will have to be lengthened so as to give payments more nearly equal to those which can be obtained by simple hire.

It is no good trying to sell enamel cookers on three or five years' hire purchase when the electrical industry is offering, as it is now doing, simple hire high-class cookers at 5s. or 6s. per quarter fixed and maintained free. We shall have to meet this competition on the same or even better terms, and whether we like it or not, the sooner we adopt this, the better.

I am certain that the electrical industry is on the wrong lines in offering high grade appliances at these low simple hire rates. We realize, of course, that at present with the disadvantages with regard to electrical cooking, especially the hotplate, it is necessary for them to do this to get in at all, but I am sure time will show that they are making a costly mistake. Even the best appliances very quickly become out of date, and although they may be no less efficient and will continue to give a number of years' good service, the temptation to simple hire users to have a change will be too strong. It would appear that for simple

hire to be satisfactory, there must be some form of agreement that the appliances will be retained for at least a reasonable number of years. Whether this will be easy to arrange remains to be seen.

Enamel or Black Cookers.

Many gas undertakings to-day are still buying black cookers with white doors for slot installations, while others are adopting the policy of scrapping all black cookers. I am not sure that the latter is the better policy, although my Company has not bought any black cookers for several years.

It must be remembered that slot cookers do not receive the same treatment as hire purchase cookers, and the cost of renovating a badly used enamel cooker is very considerable, and it is almost impossible to do this to make as good a job as can be made with the renovating of a black cooker. For this reason at least one large undertaking, after much experience, has given up putting enamel cookers out for slot installations and has reverted to black ones with white door panels.

Digressing for a moment, there is more than an element of doubt as to whether the enamel cooker is the cooker of the future; it may be that the present craze for chromium or rustless steel will before long have its effect. It is certain that with the cheapening of " Staybrite " steel, this is going to have a much greater use in the future, and it would appear to be much more durable than enamel. It all depends on the cost and to what extent it " catches on."

With regard to the scrapping of all black cookers, this is a policy which requires a great deal of courage and capital, and I am afraid that many of us will have to be content to do this gradually, as it must be remembered that although the capital so expended will help to retain the cooking load, it will not necessarily give a direct return; in fact, the opposite may be the result, as the new cookers will be more efficient than those displaced, with a consequent reduction in gas used.

Self-Lighting Appliances.

One would like to see more attention given to the question of self-lighting appliances.

I am aware that there is at least one type of self-lighting hotplate from which the ignition is done from a by-pass or a battery. This, however, does not appear to meet the case wholly, as it is a much more difficult operation to light the oven burners, especially if the oven is hot, than the hotplate burners.

The " gas match " recently marketed seems to be quite satisfactory as far as it goes, and to be much appreciated by those having it installed. Even so, I feel that there is still room for improvement.

The recent innovation of the self-lighting gas fire seems to be exceedingly good and nearing the desired result. We should not be content until such fittings are standard on all gas appliances.

Free Service.

The question as to the amount of free service which shall be given is a controversial one, but nevertheless important. My Company has for many years done a large amount of free service, and in this I include such items as pendants to replace existing old ones, boiling burners, flexible tubing, gas fire fuel, carcassing of houses, maintenance work especially for shops and other such premises, also batteries for catalytic switches.

It is often argued that the money spent in this free service would be better employed in reducing the price of gas, but personally I do not agree. The money expended in free service is such that the reduction in the price of gas would be so small as not to have any appreciable effect on increased gas consumption; whereas in a considerable number of instances the fact of free work or maintenance has led, in the case of my own Company, to the installation of appliances (especially in competition with electricity), which would not have been obtained without this service.

I do not consider meter rents come under this item, and am of the opinion that the charging of meter rents is correct. It has been stated that if one makes a purchase of a pound of apples, there is no charge for the use of the scales, but if the shop keeper had to provide scales for each customer—what then?

Gas Lighting.

It is particularly pleasing to note that of late there has been a definite change of opinion with regard to gas lighting. If the recent electricity failures are to be of a recurring nature, it is obvious that the electric grid will be a doubtful blessing to the general public. It is therefore very gratifying, though perhaps not surprising, to hear that switch-controlled gas lighting is being installed in four schools at Wombwell, and at three schools at Burton-on-Trent; especially when it is borne in mind that during recent years it has been the policy to install electric light in schools regardless of cost or efficiency.

It has also been pleasing to note the number of swimming pools, covered bowling greens, tennis courts, &c., which have recently installed gas for lighting.

Now comes the further pleasing news that the Hartlepool Gas and Water Company have been successful in securing the whole of the lighting in three reconstructed Clubs, all of which had been previously lighted throughout by electricity; also the lighting of a new Boxing Stadium, including the ring itself. (Incidentally gas is also being used throughout for heating.)

Since writing the address, I have heard that the Hartlepool Gas and Water Company have been successful in securing the lighting in connection with the new Municipal Council Chamber at Hartlepool. I am sure you will agree that they are to be sincerely complimented upon this achievement.

If these instances mean anything at all, surely they are an indication of the change of public opinion with regard to gas lighting, and should give us much encouragement for the future.

We have all heard it stated by gas engineers at one time or another that the lighting load is not worth troubling about. I have always been of the opinion, however, that the lighting load is not only worth troubling about but essential, as the loss of this load would mean an appreciable reduction in the total income.

It has been the practice of my Company for some time to make a graph each day showing the gas sent out hourly during the twenty-four hours. As this graph is made in a cut-out form, it is easily possible to compare the hourly consumption for any day with that of any other day. From this can be obtained the average hourly gas sent out during the winter and summer months, and reproduced below (fig. 1) is a graph showing the average for the two winter

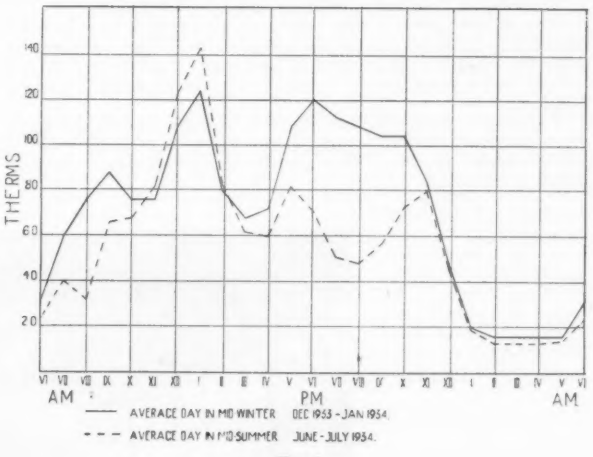


Fig. 1.

months, December, 1933, and January, 1934, compared with the two summer months of June and July, 1934.

It will easily be seen from this that the average cooking load for winter and summer is approximately the same, whereas the evening load is considerably higher in winter than in summer, and even allowing for a small portion of this for heating, it is obvious that the lighting load is very considerable.

I am prepared to admit that we cannot, by any means, get the majority of lighting in new property, but we can at least pick up, as we are doing, a useful load by fixing at very easy charges, mostly out of discount, gas lighting points (together with switches) in living rooms or kitchens, where, of course, the majority of the gas for lighting is used.

I consider the lighting question so important that I include photographs of a gas lighting installation which we recently carried out. This shop (figs. 2, 3, and 4) was a reconstruction and is fitted with ten Sugg's " Streatham " lamps, together with catalytic switches.

The photographs show clearly the very neat appearance, not only of the lighting generally, including the switch valve on the pendants, but also of the switchboard, the latter being facilitated by the fact that there is only a twin bell wire between the switch and the gas valve on the pendant.

This installation has been in use since February of this year, and up to the present time we have not had the slightest trouble, and neither the lights nor the switches have been touched in any way except for the usual free maintenance. In connection with the latter we insist that the cleaning of the glassware shall receive special attention.

The same battery (which, of course, works the whole of

the lights) has been in use all the time, and we anticipate from past experience that this will last at least two years, when it will be exchanged free of cost to the consumer, and at a cost of one shilling to the Company.

The owner of this shop has recently erected an entirely new shop on a Council estate, where, for reasons which are stated later in my address, there are between 500 and 600 houses with no gas supply. He was so delighted with the gas lighting in the first shop that he adopted this in connection with the new one. In this case there are nine "Streatham" lights complete with switchboard.

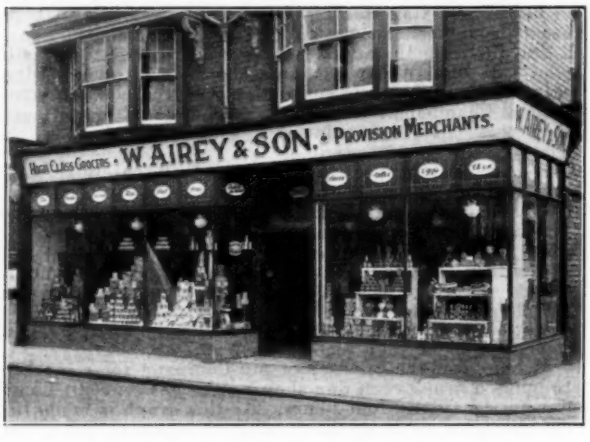


Fig. 2.

One of the points with which the owner is particularly pleased is that, owing to the installation of gas lighting, he has not required any form of heating in the shops, which would have been necessary had electric lighting been installed.

I may say that the installations above mentioned have been instrumental in securing gas lighting in a number of other shops, much of this gas lighting replacing existing electric lighting.

The question of domestic lighting receives every attention, and it might be interesting here to note that during the last five years we have fixed 8,930 burners, 4,704 pendants and brackets, and 350 switches, mostly catalytic, to just over 7,000 consumers. (The majority of the switches have been installed during the last two years, 142 having been fixed during the first six months of this year.)

Water Heating Load.

The district which my Company serves is almost 100% industrial, although the opportunity of obtaining an industrial load is very small, as the only industries—viz., iron and steel—already have their own supplies of gas, and we have, therefore, to look for our load to domestic consumers. Incidentally, I think it is hardly necessary for me to say that the district which is served has been affected as much as any in the country by the industrial depression during recent years.

There are a considerable number of houses which have no back boilers or other means of heating water, and for the last five years we have tried all forms of propaganda and advertisement and offered all sorts of terms for the installation of sink heaters and similar appliances without success.

I felt, however, that there must be a load here if we could but get it started, and a short time ago we had a fortnight's canvass offering the K.C.U. sink heater at 1s. 3d. per quarter, fixed free, for those sold during the special fortnight. The result was that 120 heaters were disposed of, and those already fixed are giving every satisfaction.

Whether the above rent is a satisfactory one is, of course, open to question, but the result undoubtedly shows that there is certainly a field if we can obtain it, and I am certain that offering at the low price of 1s. 3d. has been the means of opening up a new load which we had failed to get previously. Although the price of the sink heater has now been put on a long term hire purchase basis, I am confident that the good start which has been made will lead to the building up of this load.

For a considerable time, I have been of the opinion, from conversations which I have had with gas salesmen friends in the South, that it is a far easier proposition to sell appliances there than it is, at any rate, in our corner of the North-East, and I am now convinced of this by reading a note in the *Gas World* of Aug. 4, 1934, in which it is stated:

> "For as little as 4s. a quarter, a small storage water heater of the sink type can be obtained without any initial cost for fitting."

I am almost inclined to ask, as one of our consumers actually did in all seriousness when offered the sink heater at 1s. 3d. per quarter fixed free: "Does that also include the gas used?"

I very much doubt whether there is any gas undertaking in this district getting anything approaching 4s. per quarter for a sink water heater on simple hire.

Fig. 3.

Gas Undertakings Bill, 1934.

While the new legislation has not given us all that we hoped for, it might very easily have been worse. As far as my own Company is concerned, we wish to congratulate the National Gas Council on the inclusion of what I suppose may be referred to as the "Kettering" Clause. As mentioned previously in my address, there are between 500 and 600 Council houses in our area at the present time without a gas supply. We have, on many occasions, been approached by tenants of these houses for a supply of gas, but have not been able to make any headway. The tenants have always fought shy of approaching the local Council as, by a restriction in the rent books, they are bound to do, before taking a supply of gas.

While, therefore, as I have already stated, the Gas Undertakings Bill has not given us a minimum charge clause, thereby putting us on the same footing as the electrical industry, there is much in the Bill of a useful nature.

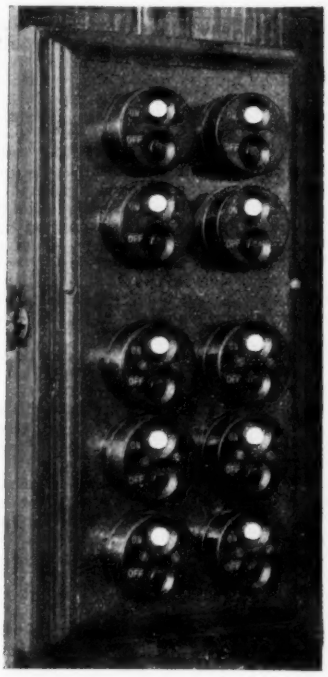


Fig. 4.

Conclusion.

In closing, may I say that had time permitted, I should have been pleased to have thrown my address open for discussion, as I feel that there are many controversial points which would have been the nucleus for a good discussion.

Please accept my personal thanks for the way you have listened to me, and also again for the honour you have done me by electing me your President.

Vote of Thanks.

Mr. W. M. GALLEWAY (Whitby), proposing a vote of thanks to the President for his address, congratulated him upon the long and honourable association of the name of Duxbury with the Gas Industry. It must be gratifying to him that he should be the fourth member of his family to occupy the Presidential Chair of this and kindred associations; it was hoped that his association with the Industry would long continue, and that in due course his son would hold the office of President. Mr. Galleway also took the opportunity to congratulate Mr. Duxbury's father, who was present at the meeting. Referring to lighting, Mr. Galleway suggested that it was not sufficiently recognized that the switch light was a very formidable weapon. In Whitby and district he had been very successful with it, and he congratulated the West Hartlepool Gas Undertaking on its success in connection with the lighting of public buildings. He had been successful in obtaining a contract for the safety lighting of a cinema, where the whole of the interior and exterior lighting was controlled from a central point by gas switches. This had been very satisfactory, and he felt sure it would be a means of increasing business.

Mr. VINCENT KELLY (Bridlington), seconding, said that it was pleasing to note what Mr. Duxbury had to say about general advertising and electrical propaganda, particularly in regard to allowing innuendoes to pass unchallenged. He did not know whether or not he had been asked to second the vote of thanks in order that he might explain his apparent inaction at Bridlington concerning statements published during the last electrical breakdown. However, he felt quite certain that what was published in the Yorkshire evening paper, referred to by the President, was not at the instance of the local electricity undertaking, and consequently, he had felt that any reply should come from the gas organization corresponding to the electrical organization responsible for the statement.

With regard to gas charges, he was glad the President had pleaded for a block charge at the standard price and then a considerable reduction on the next block, rather than a gradually reducing scale. Mr. Kelly, too, felt that a gradually reducing scale was not of very much use. Again, the President was right in thinking beyond the enamelled cookers and in suggesting that stainless steel, or something of that sort, would probably come. It was true that a lot of courage and capital would be required if the black cookers were to be scrapped—and the President was doing that. Courage and capital might have saved the lighting load. The self-lighting of appliances was another very important matter; although the lighting of a match might not involve very much trouble, he considered that more gas would be consumed in gas fires if one had only to turn a tap.

The vote of thanks was carried with acclamation.

The PRESIDENT, in his response, said he had learned a great deal in its preparation. He would have preferred that the material had been given in the form of a paper rather than as a Presidential Address, because he liked to get his teeth into something about which other people might not agree with him, so that there could be a good discussion. He also took the opportunity to thank Mr. H. Douglas Lees (Hon. Secretary of the Association) for his work; and also the staff of the South Bank and Normanby Company, who had helped him considerably not only in connection with the preparation of his Address, but also in regard to the organization of the meeting.

A New Gas-Illuminated Sign.

A new gas-illuminated sign was exhibited at the meeting, made by the "Rodlite" Company, of Leyland. It bore the words "Cook by Gas," each letter being formed by short lengths of glass rod arranged horizontally on a vertical metal base. The illumination is provided by two inverted bijou mantles situated behind the metal base, and the light shines lengthwise along the pieces of glass rod forming the letters, so that the end of each piece of rod becomes a point of light, the sides of the rods being less brilliantly illuminated. Thus, it gives the effect of block letters—*i.e.*, when viewed from an angle the letters can be seen standing out in relief. The words were of different colours, due to pieces of coloured mica being placed behind the metal base, between the glass rods and the mantles, so that the coloured light passed through the rods.

The sign was exhibited, at the President's suggestion, by Colonel H. E. Kitching, who is a Director of the Company which produced it, and also a Director of the South Bank and Normanby Gas Light and Coke Company. The idea was patented and was introduced originally for electric lighting, but he did not see why it should not be used also for gas. The example on view was the first that had been made, and it was exhibited for the purpose of criticism. It was the only sign he had seen which would produce block letters—which was its greatest advantage. It could be used as a movable sign, for any of the letters could be made to go dark from time to time, and the colours could be changed—but that had yet to be perfected.

Luncheon.

Among the guests at the luncheon, at the Grand Hotel, Middlesbrough, were Sir John P. Fry, Bart., and Colonel H. E. Kitching (Directors of the South Bank and Normanby Gas Light and Coke Company); Dr. R. E. Slade, M.C. (Managing Director, I.C.I. (Fertilizer and Synthetic Products), Ltd.), and other Directors of that Company; and Mr. Duxbury (the President's father). To all the guests the President extended a hearty welcome.

Sir JOHN P. FRY, before proposing the toast of "The Gas and Chemical Industries," expressed his Company's appreciation of the honour the Association had done Mr. Duxbury in electing him to the Presidency. He was certain that Mr. Duxbury would thoroughly enjoy his year of office, and that he would worthily maintain the traditions of his post. It would be difficult to find, he continued, two industries more closely linked than the gas and chemical industries. Both were of the very greatest national importance, and had done a great deal in the past to enhance the status of this country in various directions, besides supplying our immense population with all kinds of things necessary to their existence. The Gas Industry had been spoken of as the "Cinderella" of the public services—and in some respects this was a good simile. But, notwithstanding the competition from various sources, the Industry had made and was still making definite progress. Coming to the chemical industry, he said one must feel proud of the strides it had made in this country during recent years. It was almost impossible to realize that the vast works of Imperial Chemical Industries, Ltd., at Billingham, were of recent growth, and it was very gratifying to the district that the works were situated there. The new industry on which they had embarked of making petrol from coal, was of the very greatest importance to the country from every point of view. Sir John conveyed the thanks of the Association to Imperial Chemical Industries, Ltd., for their courtesy in allowing the members to visit the Billingham works, and for their hospitality in providing tea at the

close of the visit. He coupled with the toast the names of Mr. J. R. Bradshaw and Dr. R. E. Slade.

Mr. J. R. BRADSHAW, B.Sc. (Engineer, Manager, and Secretary, Hartlepool Gas and Water Company), in his response to the toast, first took the opportunity to renew the very sincere congratulations offered to Mr. Duxbury on his accession to the Presidency. Although, he said, Mr. Duxbury had been with the Association for a comparatively short time, the members were not slow to recognize his merits, and had lost no time in giving him the highest honour they could give. Their confidence had definitely not been misplaced.

"The Gas Industry—Whither?"

If he were looking for a text, or for a peg on which to hang his remarks, he would choose "The Gas Industry—Whither?" All engineers and administrators in the Gas Industry were aware of its glorious traditions, over a period of 120 or 130 years, of unfailing service, very willingly given—perhaps more willingly than might have been expected when one considered the hampering legislation which had been applied to it for years, and still applied, in spite of the 1934 Gas Undertakings Act. The Industry was justly proud of its past record. But what of the future? No industry could live for any length of time on sympathy and tradition; more importance attached to what it was doing and what it would do in the future. If it were to survive, it must be progressive in every way that the scientists, technicians, and salesmen could show how; there could be no standing still. When a missile was thrown into the air it did not stand still, unless it be for a very small fraction of a second when at the top of its flight; it was very certain that, after its energy was spent and after that fleeting moment of rest, it came down with ever-increasing momentum and with 100% certainty. There were people—cynics, perhaps—who would say that that would happen to the great and glorious Gas Industry. But he would draw attention to the returns, to the colossal figures of output by the Industry, which were being maintained and increased, in spite of the fact that the efficiencies of appliances and of methods of utilization were increasing beyond anticipation, so that one cubic foot of gas was veritably doing what two or three cubic feet had done before. Indeed, it would be more true to say that the Gas Industry was going ahead "because of" rather than "in spite of" the increased efficiency of appliances and the greater economy to the consumer. Who would dare to say, in Middlesbrough, of all places—where gas was claimed to be the cheapest anywhere in the world—that the Industry was a back number? Was there any reason for such a statement? If one examined the facts, one found that it was utter nonsense.

There were those in the Industry who would say, "We have finished advancing in the works; never mind scratching off coppers here and there." But coppers did matter. Advance would be made by the use of scientifically adjusted tariffs—and it was pleasing to note that Newcastle had already launched a new and very good tariff, put forward in an attractive way. But the last word had not yet been said in regard to price, and in his opinion it would not be said until they had a tariff comprising some definite standing charge—based on rateable value, floor area, or anything else—together with a commodity price of 1s. or less per 1,000 c.ft., so that he would have it in his mind that gas cost 1s. per 1,000 c.ft., in the same way that he thought electricity cost ½d. per unit. Generally speaking, the cost of electricity was not just ½d. per unit, but the consumer thought it was. The Gas Industry must do something in that way; and Mr. Bradshaw appealed for a go-ahead spirit among all in the Industry, from the juniors in the office to the Managers and Managing Directors—not forgetting the Directors in the Board Rooms. They must be done with the inferiority complex, even in respect of lighting, and the public must be shown that there was nothing antiquated about gas.

Dr. R. E. SLADE, M.C. (Managing-Director, I.C.I. (Fertilizer and Synthetic Products), Ltd.), also responded to the toast, and confined his remarks to some aspects of the Gas Industry, from the point of view of the chemical industry. The Gas Industry was of very great importance, not only in respect of its domestic services, but also as a factor in the distribution of the industries of this country, especially many of the lighter industries. If it were desired to attract industries to a district they must have services, and gas was one of the most important of those services. Dr. Slade said that, while he agreed with Mr. Bradshaw that gas companies had to do everything possible to advance scientifically and to bring down costs of production, he believed that hydrogenation would only pay when it was done on a large scale, so that expert supervision could be provided and engineering specialists employed. Very great care must be exercised when using pressures amounting to tons per sq. in., and it was necessary to organize a system of regular inspection of every detail of high-pressure plant. The hydrogenation of coals, oils, and tar was likely to remain for some time a process needing all the skill and experience of the chemical industry; it was not a process which could be handled merely as a sideline in the gas or any other industry, but one which must be treated as a major undertaking.

Midland Junior Gas Association

Presidential Address of Mr. J. H. Wainwright

The first meeting of the Session of the Midland Junior Gas Association was held on Thursday, Oct. 4, at the Reading Room of the Birmingham Gas Department; Mr. S. K. HAWTHORN, Birmingham (Retiring President), occupying the chair at the opening of the proceedings.

A letter was read from Mr. R. J. Milbourne, Wellington, expressing regret that he was unable to attend and present the "Milbourne Medal."

Mr. R. S. Ramsden, President of the Midland Association of Gas Engineers and Managers, formally presented the Medal, which was for a joint paper by Messrs. F. H. Bate and A. R. Myhill.

In installing Mr. J. H. Wainwright (Halesowen) as President, Mr. HAWTHORN pointed out that Mr. Wainwright had been an active member of their Council for several years.

Mr. WAINWRIGHT, who had a most cordial reception, said it would be his aim to uphold the high traditions and prestige of the Association. In moving a vote of thanks to Mr. Hawthorn he paid tribute to the efficient way in which he had discharged his duties as President.

The resolution was seconded by Mr. F. A. C. PYKETT (Coventry).

Acknowledging the compliment, Mr. HAWTHORN attributed the success of the last session to the loyal support accorded to him by the members and the Council, and the service rendered by Mr. Alfred Hills, Hon. Secretary.

PRESIDENTIAL ADDRESS

Of J. H. WAINWRIGHT, M.Inst.Gas E. (Halesowen).

The importance of low ash content in coal has been dealt with so often that it is unnecessary to enumerate the advantages here. The reduction of moisture, however, is capable of further investigation and will result in a decreased cost of coal on a dry basis, decreased carriage charges, and less heat being required for carbonization. Drying at the colliery, or dry cleaning instead of washing, make these advantages possible and are likely to become a more regular practice.

The principal reason for cleaning the coal is to produce a coke with a minimum ash content. There are three methods of accomplishing this—namely: (*a*) by cleaning the coal as mined at the colliery; (*b*) by cleaning the coal after delivery to the gas-works; and (*c*) by cleaning the coke after carbonization. The method to be preferred is unquestionably the first, and reduces the raw coal by between 10 and 15% in most cases before any carriage costs are involved. It is widely practised already, and might quickly become almost universal if its commercial aspects were more sympathetically viewed by the Gas Industry.

It is only within the last decade that the consumer has insisted not only on well screened coke from gas undertakings, but also upon products which contain a minimum of ash and moisture in the coke particle themselves, together with an absence of the pieces of incombustible material usually known as "bats." This is due mainly to three causes, the first being that the buyer has had during this period an almost unprecedented opportunity for enforcing his demands as regards quality upon a depressed market; and the second lies in the fact that not only gas coke but fuel of all descriptions is subjected to an increasingly rigid inspection by the purchaser. As regards the third cause, this is the presence of a comparatively new competitor in the domestic coke market as a result of the cutting and screening of metallurgical coke into domestic sizes.

Until recently, the only method available for removing heavy incombustible impurities from coke was by wet washing, and although various processes have been employed, probably the most successful is the "Blackett" washer. Its wide application confirms its successful performance in practice. It is capable of separating "bats" from coke when treating a closely sized feed at low capacities. Heavy construction, simplicity of design and operation, together with the ability to handle a fluctuating feed of varying dirt content are among its main advantages.

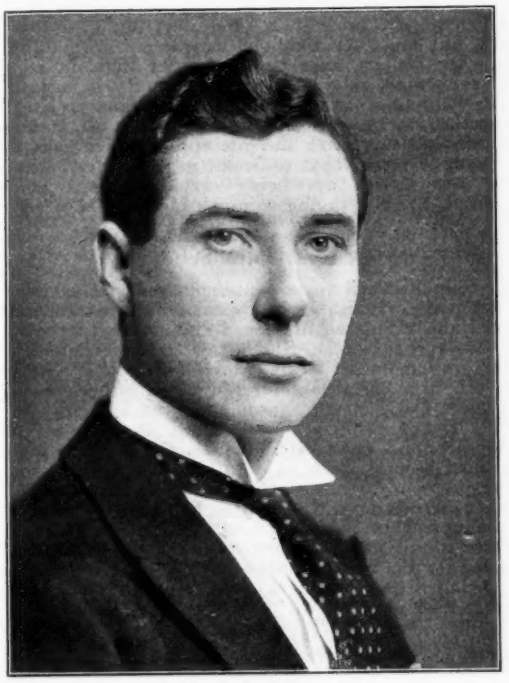
Moisture Content.

In common with all processes for washing coke, however, it operates under the disadvantage that it wets the coke,

and the percentage of added moisture may well be considerably greater than the percentage of " bats " removed when washing. This is especially so when the coke is washed before it is cold, as then the contact with the cold washing water causes the gases in the pores of the coke to contract, with the result that the water is drawn in and the washed coke has a higher moisture content which cannot be substantially reduced without resorting to thermal drying. Although it may seem almost incredible, experiments have shown that it is possible to fill 80% of the pore space in fairly dense coke nuts with water by this means. Added moisture in the coke is not only a distinct disadvantage from a sales point of view, but it must also be remembered that it increases the density of the coke and renders its separation from the " bats " more difficult.

Natural drainage does little to reduce the moisture content of washed coke nuts, but, given dry weather, some reduction may be obtained by storing the coke in shallow heaps.

The complete removal of the moisture by passing the washed coke through thermal dryers has been suggested and discussed, but, so far as the writer knows, has not yet been adopted. In any case, with an abrasive product such as coke, thermal drying has not a great deal to recommend



THE PRESIDENT.

Mr. J. H. Wainwright was articled to Mr. William Prince at the Tipton Gas-Works, where he was later appointed Assistant Engineer and Manager. In 1926 he became the Engineer and Manager of the Halesowen Gas Company, and Secretary in 1930.

it, even assuming that the dryers were fired with coke recovered from pan ash, or similar low-grade material.

The Pneumatic Process.

The second alternative now available for the removal of the incombustible particles is the pneumatic process, in which the coke is floated by means of air instead of in water. Coal has been treated by this process (which originated in the United States of America) for about 15 years, and since its introduction into this country some 10 years ago by the Birtley Company a number of plants have been installed at collieries for the cleaning of gas coals, and on several gas-works for the cleaning of coke nuts.

Wet washing would cause a substantial increase in the moisture content of the washed coke, whereas pneumatic cleaning has the advantage of reducing this constituent to some extent at least. The decrease in the moisture content of the coke after passing over a pneumatic separator will not, as a rule, amount to very much, and is a variable factor. In the first place, it depends on the temperature and humidity of the air used in the separation, and moisture reductions obtained during hot, dry weather would become negligible during a November fog. Further, the moisture reduction will also depend on the size of coke which is being cleaned, as the drying effect of the air can only operate at the surface of the coke, so that the smaller the pieces of coke the greater the surface exposed per unit weight and the greater the drying effect that can be expected. As a process, dry cleaning seems to provide the means for preparing gas coke with lower ash and moisture contents, and with a higher percentage of fixed carbon, than has hitherto been possible.

Steaming in Horizontal Retorts.

Investigations carried out at the Fuel Research Station have shown that it is possible to increase the gas yield when carbonizing coal in horizontal retorts from 75 to about 84 hours per ton by steaming for the last two hours of the charge.

In considering this matter it must be borne in mind that the commercial efficiency of the process of carbonizing coal in horizontal retorts is about 78%, and that this becomes about 82·5% if all the power is derived from waste heat steam. On the other hand, when coal is carbonized in continuous vertical retorts equipped with waste-heat recovery plant, the commercial efficiency of the process is 85·6%. In other words, if the steaming of the charge in horizontal retorts is undertaken along the lines indicated by the work at the Fuel Research Station, the principal aim is not an increase in the commercial efficiency of the process as such, but rather to increase the proportion of the potential energy of the coal in the form of gaseous therms.

This quite clearly may be an advantage in most works where the price to be obtained for the additional gaseous therms produced by steaming is such that a decided advantage is gained by comparison with the reduction in the amount of coke available for sale. The increased output of gaseous therms from a given plant is equal to an increase in the size of the plant. This happens to be an important consideration at Halesowen at the present time.

In addition to an increased make per ton due to some water-gas reaction, the water vapour softens the hard " pitchy " deposit in the ascension pipes, which enables higher " heats " to be carried in the settings of retorts with less possibility of stopped pipes. It is considered that a further increase in the gas yield per ton of coal is attributable to the fact that the water vapour carries the hydrocarbons away from the hot coke in the free space above the retort more quickly, preventing degradation of the hydrocarbons.

Change in Declared Calorific Value.

A recent change in declared calorific value at Halesowen prompts me to set out the statutory obligations involved in accomplishing this change.

It is necessary to give not less than three months' notice of such intention and to state the proposed new declared calorific value. This notice must appear in the *London Gazette*, and copies thereof must be sent to each local authority within the area of supply, as well as to the Board of Trade and to each consumer. It is not essential that a copy of the notice be sent to each consumer by post. It will suffice if a copy is delivered at each consumer's address by the meter inspector upon his usual visit.

A suitable form of notice would be:

GAS REGULATION ACT, 1920.

In pursuance of Section 6 of the Halesowen Gas (Charges) Order 1922, the Halesowen Gas Company hereby give notice that as from the first day of September, 1934, they will supply gas of a declared calorific value of 475 British Thermal Units per cubic foot.

J. H. WAINWRIGHT,
Secretary.

Witness to the above signature—

.....
(*Solicitor.*)

Dated *May* 27, 1934.

It should be specially noted that the copy sent to the *London Gazette* must have the signature of the Secretary witnessed by a solicitor. Failure to observe this point, or any other breach of regulations, would cause the notice to be returned for completion, which may result in insufficient cient notice being given and a postponement of the change of calorific value becoming necessary.

Section 7 of the Halesowen Gas (Charges) Order reads: " If and so often as the undertakers shall alter the declared calorific value of the gas they shall at their own expense effect such alteration, adjustment, or replacement of the burners in consumers' appliances as may be necessary to secure that the gas can be burned with safety and efficiency, except in the case of any consumer who objects to such alteration, adjustment or replacement as aforesaid."

While on the question of calorific value, it may be of advantage to some members to mention that the frequent adjustment of " Sigma " recording calorimeters has been obviated by fitting to the scale arm a piece of celluloid, having a vertical red line marked down the centre of it, and reaching to within about a quarter of an inch of the pen. Instead of adjusting the pen arm as required to indicate the actual calorific value of the gas on the chart, following a

check test being made, the celluloid is moved to correct for the extent that the calorimeter is recording wrongly, and the foreman and stokers are instructed to "work to the red line;" in other words, to maintain as nearly as possible a line corresponding with the line on the celluloid.

Only occasional adjustment of the pen arm is necessary in conjunction with this method, which, from our experience, is found to be preferable for the purpose of minimizing corrections to instructing stokers to operate, say, 10 or 15 B.Th.U. fast or slow of the calorific value shown on the chart.

Hire-Purchase *v.* Simple Hire.

The necessity of fixing appliances, particularly cookers, on simple hire is held by many to depend upon the district or the ability of a section of the consumers to pay for the appliance by any other means. The modern tendency, however, seems to be a disinclination to pay a regular charge for an article which will not become one's own property. At the same time, from the gas undertakings' point of view, the comparatively short time in which a cooker becomes "out-of-date," with the consequent likelihood of the consumer changing to an electric cooker (accentuated by the fact that some persons think that they are becoming "up-to-date" by cooking with electricity) makes the cost of replacement a heavy capital expense on the undertaking.

It is unreasonable for us to think that black cookers are satisfactory to place on simple hire. How soon may it be necessary to supply cookers fitted with a thermostat or automatic control? This is mentioned solely to establish the fact that the period during which a type of cooker may be regarded as satisfactory on simple hire to uphold the best traditions of the Industry is only a few years. The expense of replacement must either be partially borne by some other "standing charge," most likely to reflect on the price charged for gas, or the rental of the cooker will be a high one. We must take care to see that it does not become a charge to inflate the price of gas. It is in our interests to reduce this to the lowest economical price as the strongest argument to assist sales. If the quarterly rent to be charged for the cooker is high then it will become increasingly difficult to persuade consumers to take them.

Scrap the "Black" Cooker!

This points to selling appliances by hire-purchase terms over a period of three, five, or even seven years, when the psychological effect will exercise itself on the consumer to retain that which he has bought. We are then able to sell a better grade of cooker, fitted with thermostat and chromium-plated fittings, which are more economical in use and better able to withstand electrical competition. It is in our interests to replace the old black cooker by a more modern one without delay. Our competitors are making good propaganda out of the comparison of our cast-iron, inefficient cooker with their smart-looking, labour-saving, and space-saving appliance. When we bring in those old-type cookers, instead of renovating them it would be far better to scrap them, on the argument "Out of sight, out of mind."

In this respect, are we taking sufficient steps to combat the intensive canvassing campaign being waged by the electrical industry? Assisted by the salesmen of the appliance manufacturers, who are calling from door to door selling one or other of the legion of fittings—and generally on hire-purchase terms—to consume electricity, they are popularizing it and in many cases depriving us of a part of our load. They are always most ready to sell a cooker, the salesman because it is a good-priced appliance on which he will draw a very useful commission—and they always work on a commission basis to maintain keenness—and the electrical undertaking because this is the load which they are most anxious to wrest from us.

At Halesowen the practice of fixing cookers on simple hire was discontinued many years ago, and consumers are encouraged to have appliances on hire-purchase terms, or for cash, with very satisfactory results. We explain, and believe, that it is in the interests of the consumer that the cooker, fire, &c., should become their own property instead of remaining the property of the gas company and the consumer having to pay a perpetual charge. With few exceptions, such as persons who are likely to move away from the district without much notice, this method is preferred. We are now facing the competition of electric cookers which are offered and fixed free of charge. We have no intention of meeting this by placing gas cookers for the consumers' use without direct charge, and intend to press our argument of the advantages of hire-purchase. We know that running costs will eventually strengthen our case, and we are aware of instances where the electric cooker has been removed again after only a few days from the date of fixing.

The Wireless "Lever."

Continuing the question of electrical competition we must give that industry credit for having been quick to grasp their opportunity to make wireless their ally in developing sales. It has assisted the installation of electricity for lighting tremendously, because the fixing of three or more lighting points at the same time as fixing the point for wireless has been insisted upon. They have followed up this advantage, we must admit, extremely well, and with a keen intention to increase consumption as a means of reducing the cost of electricity per unit.

The vacuum cleaner, the electric kettle, and so many other labour-saving devices have been most helpful to them in this way. It will probably be thought that many of these appliances do not concern us because we have nothing of the kind, and are not losing an actual or a potential load. But it does and must concern us, because while these canvassers to whom I have referred are offering vacuum cleaners they are also attempting to sell (say) a hair-curling set or even a fire! And when the point is fixed in the kitchen, lounge-hall, the living room, or the bedroom, it is available to be plugged into for purposes in which we *are* interested. We must not overlook these points, but must see that our canvassers are calling, not only when we are expecting an order, but, in addition, when they may only have an opportunity of adjusting a burner—saying a "good word" for gas and its uses, preparing the way for a sales later, and, above all, leaving the housewife satisfied with the gas appliances already fitted. The value of seeing that sufficient gas "points" are fitted when new houses are being erected cannot be overestimated, thereby saving so much inconvenience and part of the cost.

General Sales Scheme.

The foundation of any sales scheme must be a knowledge of all the opportunities which exist. Information must be secured and tabulated in such a manner that it is quickly available to enable the sales attack to be conducted with the maximum results without loss of time.

In the first case, therefore, a classified census of the appliances fitted on all consumers' premises must be prepared. During the preparation of the census, which should be done by selected men who are trained fitters, it is most helpful, both in obtaining the information and in the interests of the consumers, to carry out some free maintenance work, with a charge being made for any new parts supplied.

While the necessary information is being obtained, and allowing for the time required to make minor adjustments to lighting fittings, cookers, fires, renewing fuel, &c., the fitter can be expected to make about 60 calls per week. With the information thus obtained, and the prospects of new business ascertained, the sales campaign should include frequent and regular calls, cookery and general demonstrations, circularizing, and advertising. In conjunction with the latter the window displays are most valuable.

Before the canvasser calls the consumer should be advised by a special letter setting out the facilities offered. On the occasion of each call the census card must be checked and, if required, corrected. The following routine should be observed: Examination of service, main cock, and meter; see that the meter and pipes are large enough; test for escapes; adjust all lighting fittings and appliances; make special notes of unsatisfactory or unsuitable appliances; and record the slightest prospect of any future order. It is important not to allow the consumer to gain the impression that the canvasser is merely out for orders.

Vote of Thanks.

Mr. F. L. Atkin (Birmingham) moved a vote of thanks to Mr. Wainwright for his address.

Mr. F. A. Jenkins (Leamington), in seconding, said that Mr. Wainwright had rightly given pride of place to the question of the cleaning of coal and coke, and of securing clean coal from the source. There was no doubt that a great deal could be done in this direction by insisting on a minimum of ash content in coal. The sampling and testing of the coal took a considerable time, but the expense was amply justified. There was a tendency to use coke more in the open fire, and undoubtedly that method of burning coke showed that advances could be made in the Gas Industry. He was pleased to note the President's references to the pneumatic process, because a short time ago he had the opportunity of observing that process at work, and the way in which the bats appeared to remove themselves from the coke visibly on the cleaning screen was most striking. Unfortunately the subsidiary plant required for this purpose, for providing the air space and removing the dust, was expensive in the small units. As regards steaming in horizontal

retorts, he had no doubt that it was a great advantage on temporary expedients. He noticed that Halesowen had changed its calorific value, and it would be interesting to know the reason for the change, particularly in view of the standard of calorific values under consideration at the present time. The advice as to scrapping black cookers was a counsel of perfection, and what were they to do when a concern had thousands of these black cookers on hire? They formed a valuable asset, and if they were scrapped they had to be paid for and in some way their value had to be made up. Moreover, many of their users were people to whom even 1s. a quarter was a consideration. He scarcely thought that it was sound financial policy to scrap them on a wholesale scale. At Halesowen he understood they had given up the hiring of cookers; it was nice to be able to do so, and it might be an ideal to work to, but it was a fact that a lot of people preferred to hire. There were some people who simply would not entertain the idea of purchasing a cooker.

Mr. H. S. ADAMS (Bilston) supported the vote. As to hiring or scrapping black cookers, he suggested that if there were thousands on hire, and it was decided to change the policy and put out enamelled cookers, they would find nearly everybody would want to replace the new for the old and involve the concern in tremendous expense. In Bilston they had on simple hire a black cooker with a white door panel, though this admittedly was not the best thing to-day. Were they to change to enamelled cookers, he was afraid they would be inundated with applications for replacement. He certainly considered that the simple hire system was a valuable one and should be retained, particularly in districts like his own.

The vote of thanks to the President was subsequently declared carried, and it was announced that in view of the interest taken in the paper, the discussion would be continued.

Mr. H. R. LAWTON (Stourbridge) was glad that the presence of bats in coke had been referred to, as with the advent of the coke fire there was no doubt that this question would have a big effect on the sales of these fires. In his district there were a number of such fires, and people were complaining about the quality of the coke. The probability was that bats were one of the main causes, and something ought to be done to free the coke from this trouble, so that the tendency for coke fires to replace coal fires could be encouraged. He invariably found that the introduction of a coke fire had been on account of the prevalence of down draught, and in a coke fire they must of course have a good draught.

Mr. A. R. MYHILL congratulated the President on establishing a precedent in allowing them to discuss the address.

Mr. F. A. C. PYKETT said old black cookers in Coventry were being re-enamelled and sent out again. This was being done at the rate of 150 per week and had proved highly successful.

Mr. W. MACNAUGHTON (Wolverhampton) claimed that in his district they produced the finest coke on the market, and wondered why there had been a change in the calorific value at Halesowen. Was it a question of hoping to get therms in the holder to reduce the rate, or of altering the calorific value suitable to the majority of the customers? At Wolverhampton during the last two years they had been taking over many old black cookers per week for re-enamelling, just as was done at Coventry.

Mr. D. WARD (Birmingham) said that if they could persuade customers to adjust appliances properly and induce them to do so, he believed that gas lighting would become more popular, but this would not be achieved unless those in the Industry believed in its worth.

Mr. S. K. HAWTHORN alluded to steaming in horizontal retorts, and asked whether they obtained any increased thermal yield per retort per day. They could not admit the steam until the carbonizing was practically complete, and when they did admit the steam they were losing carbonizing time. Although the therms per ton would increase, there seemed every likelihood of the therms per retort per day decreasing. There was also the question of a large increase in fuel consumption, and he wondered whether the President had noticed if this had taken place. If steaming enabled them to carry higher heats, what was the cause preventing them from carrying the highest heat without steaming? Was it the result possibly of charging machines not filling the retorts adequately, because he understood that modern retorts with full charges were reasonably free from stopped pipes?

The PRESIDENT, replying to the discussion, said that they must make every effort to retain such a valuable asset as street lighting and more advantage of the great convenience of the gas switch for general use ought to be made than hitherto. By-pass consumption involved considerable waste, and it was to be hoped that the catalytic switch would be of assistance in this respect. It must be borne in mind that the battery should not be placed too near the burner. If they could not get a low ash content by any other means, then it was up to the buyer to obtain what advantage he could in a guaranteed system. Mr. Jenkins had inquired as to the reasons for changing the calorific value. Well, it was expected that a slightly higher thermal yield would be obtained from the calorific value of 475 than of 440. It had been his endeavour ever since he had been at Halesowen, which covered eight years, to increase the declared calorific value from that which his predecessors thought fit to declare in 1922. It might have been more suitable in those earlier years, because at that time there was for the size of the district a fairly large number of gas engines in use; but unfortunately a good many had since changed over to electric power or to oil engines, and there was not the same favour shown for retaining a comparatively low calorific value of 440.

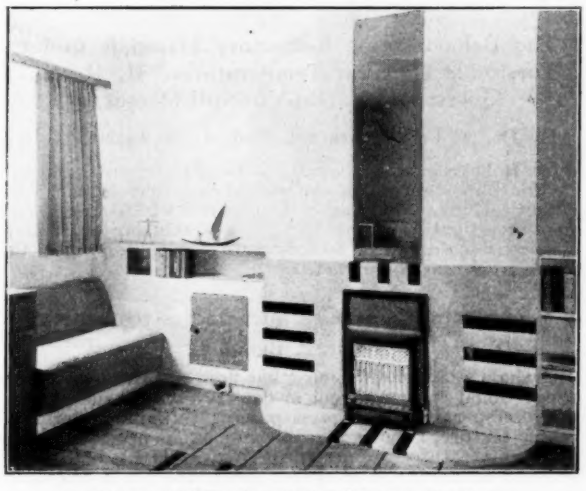
In connection with the disposal of black gas cookers, he thought this question had been answered by certain speakers. But it was not merely a question of what were they going to do about enamelling the cookers, but how long would consumers be satisfied with a mottled enamel cooker. And, further, how soon would consumers generally want thermostatically controlled cookers? Regarding the steaming of coke in horizontal retorts being a success, he might mention the definite success in this respect at a neighbouring town where very good results were being secured. The Manager had gone into the process thoroughly with all types of control, and he imagined that the Fuel Research Station had proved it profitable to steam in horizontal retorts. He had not done so well with steaming at Halesowen as he had hoped, but they were persevering with the process and were now more optimistic. He imagined that superheated steam was likely to assist in this matter. He would point out, however, that some water gas reaction was obtained, but the question of getting the hydrocarbons away from the charge was definitely practicable, and he thought that by the time the Association visited Halesowen in April he would be able to give them definite proof that steaming in horizontal retorts produced some advantages. No doubt the method of treating black cookers at Coventry, by mottled enamelling, was the proper way in contrast to the paint method. Mr. Hawthorn had asked about stopped pipes. In his experience higher heats in retorts produced trouble of this nature. On the point of therms produced, he believed that a slight increase in therms per retort per day would be experienced.

High "Beam" Fires by Richmonds Gas Stove Company, Ltd. (Radiation).

We have just received an attractive Richmonds catalogue which is devoted to High "Beam" Gas Fires. Three distinctive designs are shown—namely, the "Reflector," the "Castile," and the "Flambeau," and these are illustrated in various of their well-known Lustre finishes.

These fires are a departure from the orthodox. Each is specially designed to conform to the modern standards of architecture, and a simplified mode of treatment is noticeable in all the new models. Another striking feature is the new, full High "Beam" fire front which is composed of two distinct entities—*i.e.*, the Columnar Plaque-Radiants, which become uniformly heated to a high temperature, giving an exceptionally pleasing appearance and emitting energy rich in short infra-red rays, and Curved Upper or "Scrubber" Plaques which abstract from the combustion products a further measure of heat, thus combining to give to the High "Beam" gas fire a high radiant efficiency.

Another distinctive feature of the new High "Beam" fires shown in Richmonds' list is that each is fitted complete with the Radiation "Self-lighting gas tap," which does away with the need to use a match or taper to light the fire. It is only necessary to turn on the gas by means of this tap, and the fire lights up automatically. There is no by-pass light burning continually. The pilot jet is only ignited momentarily when the fire has to be lighted.



Richmonds' "Flambeau" High "Beam" Gas Fire.

Our illustration shows the "Flambeau" installed in a modern setting.

The Ceramic Society in London

The Autumn Meeting of the Refractory Materials and Building Materials Sections of the Ceramic Society was held at Olympia on Sept. 20, the respective Chairmen being Col. A. Stein, M.C., and Mr. E. Gwynne Vevers.

The papers introduced at the meeting of the Refractory Materials Section included the following.

The Burning of Magnesite Bricks.—Part II.

This was by Dr. J. H. Chesters and Prof. C. W. Parmelee, who furnish a brief abstract of their paper. A test-piece mould designed to give pressure-compression curves up to 50,000 lbs. per sq. in. and a Modified Reaction-Expansion Apparatus for work at 1,500° C. are described. By using a grading of 70 : 10 : 20 (coarse, medium, and fine, respectively), high moulding pressure, and an addition of mucilage, unfired test-pieces of electrically fused magnesia having porosities as low as 15·5% were obtained. The pressure-compression curves of the materials examined all showed a fairly rapid falling off in the rate of compression with increasing pressure. Thus an increase in the moulding pressure from 4,000 to 12,000 lbs. per sq. in. produced the same decrease in test-piece length as the change from 12,000 to 37,000 lbs. per sq. in.

The burning shrinkage on the test-pieces fell as the moulding pressure rose to 12,000 lbs. per sq. in., and then remained essentially constant to 37,000 lbs. per sq. in.

After shrinkage tests made on two low iron and two high iron commercial bricks showed that the initial rate of shrinkage was much greater for the high iron bricks, being as high as 3·2% linear after two hours at 1,500° C., but only 0·6 and 0·3% for the low iron specimens. The shrinkage was found to be due to decreasing porosity, and not to increasing density of the magnesia.

The Burning of Magnesite Bricks.—Part III.

By Dr. Chesters and Messrs. G. L. Clark and K. C. Lyon.

The average crystal sizes of a number of dead-burned magnesites prepared from both Austrian magnesite and crypto-crystalline magnesite with very different heat treatments were all found—by the Lane diffraction method—to lie in the range 0·06 and 0·08 mm. The average size of the rounded units within a grain of Austrian magnesite as determined by microscopic measurements, was found to be essentially the same as the average crystal size determined by the Lane method. Austrian magnesite peas were found to show preferred (not random) orientation of the periclase crystals within a grain, while certain samples, in particular those of electrically fused magnesia, showed marked signs of internal strain (which was not removed by slow cooling from 1,500° C.).

The results recorded in the two preceding papers, while apparently academic, are highly important because of the light they throw upon internal structure, and in that way point to possible improvements.

The Behaviour of Refractory Materials under Torsion at Different Temperatures. II. Kaolin-Quartz and Kaolin-Vitreosil Mixtures.

By Dr. A. L. Roberts and Prof. J. W. Cobb, C.B.E.

Dr. Roberts briefly recounted some of the results obtained in this important research, and stated that in the later stages certain results had been obtained which needed further investigation for their adequate explanation, and it was considered better to postpone publication until the whole work was completed.

Permeability of Ceramic Bodies to Gases.

By Dr. P. Bremond.

Graham's law of diffusion (that flow of gases is inversely proportional to square root of density), while true at ordinary temperatures for gases passing through material of coarse texture, is not applicable to gaseous permeability at high temperatures. Poiseville's viscosity law is better, but still not accurate. The author has found the Sutherland-Poiseville expression very accurate. The rate of flow decreases very rapidly with increase of temperature. Thus coarse bodies are highly permeable at room temperatures and "corked" at high temperatures. This type of flow is encountered approximately with bodies of coarse structure and not too thick, like saggar walls, silica bricks, &c. But permeable ceramic bodies are a mixture of coarse and fine structures from the gas kinetic theory point of view.

The permeability of bodies of fine structure (hard porcelain, earthenware, burned clay, &c.) is governed by laws in which the essential factors are the square roots of densities and the absolute temperatures, and the rate of adsorption of gases on the walls of the capillaries. The calculation of such a flow through a fine body at high temperature is impossible, because it depends on adsorption, which is variable from one material to another. The light gases cross the fine structures more easily than the heavy ones, and this may make a difference of gas pressure in permeable bodies. Thus hydrogen and hydrocarbons in contact with fine-structured bodies pass into them rapidly, and are adsorbed by the walls of the capillaries, thus starting physico-chemical catalytic reactions between gases and solids.

The author's experiments have shown that colloidal matter (raw or calcined) such as clays, china clays, halloysite, colloidal silica or alumina, ferric hydrate, carbon, being of very fine structure, are practically the only ones which are affected by reducing gases or hydrocarbons (and therefore coal gas) at high temperature, with the immediate breaking down of hydrocarbons and formation of carbon deposits in the body. Conversely, under the same conditions, crystalline materials, such as quartz, felspar, ground raw enamels, being of coarse structure, are affected very little or not at all, and no deposit of carbon takes place.

Further, when the composition of gases surrounding a saggar (or other body of similar structure) changes, the lightest of them penetrate or escape through the fine parts of the saggar body, rapidly causing difference of pressure (several cm. of water) between the inside and the outside of the saggar. If there are cracks or a coarse structure inner or outer gases flow through them immediately, producing swift gas movements or gusts of gas. This is a plausible explanation of burning troubles in which only part of the contents of particular saggars are defective.

One of the papers read at the Building Materials Section's meeting was of unusual interest, since it concerned clays of all kinds.

De-Aeration of Clay.

By John M. Willis.

This bears primarily on faults which are first noticed in the machine house or drying shed—blistering, lamination, and cracking.

As no air must be allowed to enter the article once it has been extracted, a perfect seal to the mass of the de-aired clay must be maintained right up to the time of extrusion into the atmosphere.

In the machine now in use the clay is made to form its own seal to the actual vacuum chamber, and upon extrusion from the first auger the clay is disintegrated thoroughly, ready for "de-aeration," and at this point the layers or jackets of air around the clay particles are removed, enabling those particles to join together and form a perfect bond.

As blisters are caused by these layers of air between the clay, if this clay is not exposed to the atmosphere before extrusion, no blisters can occur.

Blisters and lamination are very closely allied, and if one is prevented the other is nearly sure to be prevented.

On leaving the de-airing or vacuum chamber, the clay is forced down the second auger to the die mouthpiece in a perfectly homogeneous mass free from layering or lamination. The dies are used without having to "fake" the feed by diverters or other methods.

All shortness in the clay has disappeared, and both tenacity and strength has increased. As to working properties, most clays can be handled much like rubber to pull or push articles into any reasonable shape without fear of cracking. Articles have been run from the machine 16 ft. long, without cracking or breaking away from the die—the machine being a vertical one.

A great deal more heat can be applied to the green articles after the new process without causing distortion, blistering, or cracking.

In the porosity test on fireclay, as low as 0·039 has been obtained.

The density and strength of the de-aired brick are comparable, and often superior, to the same qualities in the best-quality pressed brick.

Samples were exhibited which seemed to confirm many of the statements made.

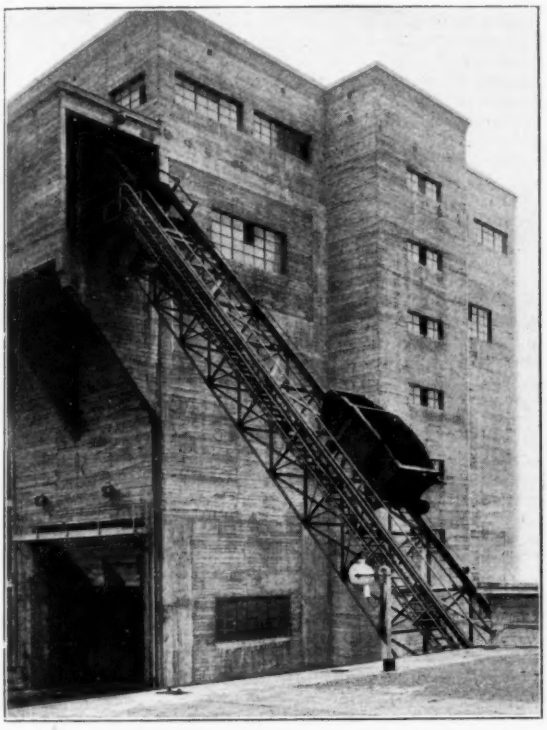
Coal and Coke Handling at Zurich Gas-Works

Completely Automatic Installation

We have received from Herr E. Ott, Assistant Director, Zurich Gas-Works, the following account of the coal and coke handling installation at the Zurich Gas-Works which proved of such interest to those who visited the works on the occasion of the International Gas Conference.

For the transport of raw coal from the wagon-tipper to the breaker, of fine coal from the blending plant to the service bunkers above the ovens, and of coke from the ovens to the coke grading plant, inclined elevators of large capacity and high efficiency are employed. This article is a description of the elevator for carrying fine coal to the bunker above the ovens, the other two being similar in construction, as will be gathered from the photographs reproduced.

The capacity of the elevator in question, which is driven by a 50 H.P. motor and has a speed of 8·5 ft. per second, is 120 tons per hour. It delivers the coal to a height of about 100 ft., and the operation is entirely automatic. The hammermill which breaks the coal to a fineness of $\frac{3}{8}$ in.

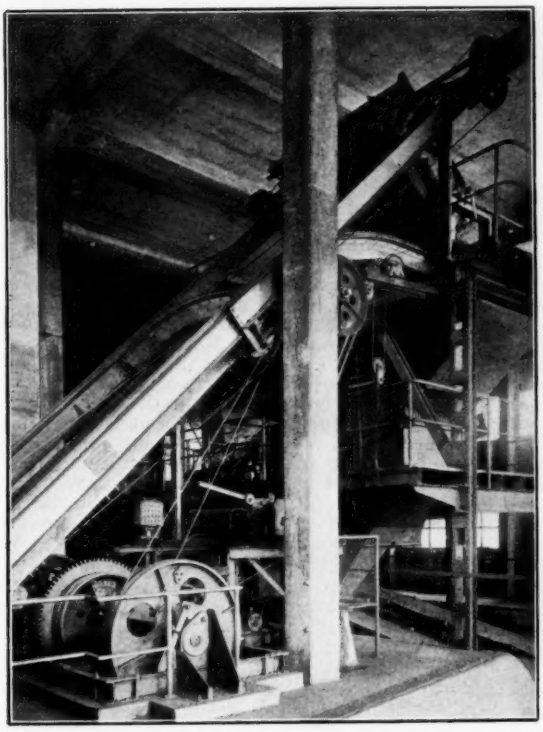


The Fine Coal Elevator, showing the car, the curved entrance into the bunker, and the bunker outlets.

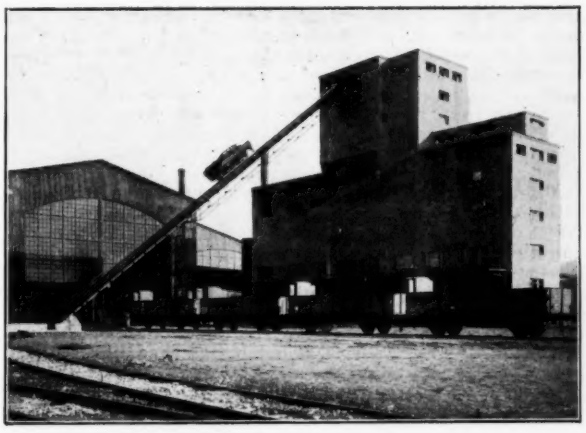
or less empties into a hopper above the lower endstop of the elevator. The container of the elevator car rests upon springs, and as soon as the container has a certain weight of coal, which can be regulated by the springs, the bunker operates a switch which in turn operates a controller on the windlass, and the container moves upwards. At the top of the incline, just prior to assuming a horizontal position, the elevator car automatically switches the controller to slow speed, so that the car moves slowly at the curved part of the top of the elevator towards the endstop. A counterweight operated by the incoming car then pulls the car back to the inclined part, and the car empties its contents into the distribution hopper below.

The out-going elevator car, just prior to leaving the bunker, releases again by a switch the distribution hopper. This hopper moves on horizontal rails and at right angles to the motion of the elevator. It delivers its contents in equal quantities into the different fine-coal bunkers above the ovens, and having done this returns to its initial position under the elevator. Here again the operation is entirely automatic. On its downward journey the elevator car, just before reaching the lower endstop, switches the controller on to slow speed and the car moves slowly to the endstop below the filling hopper.

To ensure equal distribution of coal in the bunkers above the ovens, the distribution hopper into which the coal is discharged is of special design. The bottom of the hopper consists of a waterwheel like drum extending over the whole width of the bunkers. As the hopper moves over the bunkers this drum rotates and distributes equal quantities to each bunker. The hopper and the drum are each driven by a 3 H.P. motor. Various safety switches are incorporated so that the elevator car can never approach at full speed either the lower or the upper endstop, and it cannot move above the distribution hopper if the latter is not in its proper place.



Raw Coal Elevator with the grizzly, the breaker, and the belt conveyors.



The Coke Elevator and Screening Plant.

Western Junior Gas Association

Address by Mr. C. Valon Bennett

The Opening Meeting of the 1934/5 Session was held in the magnificent new showrooms of the Bath Gas Company on Oct. 6, and, despite the inclement weather, there was a very good attendance to hear Mr. C. Valon Bennett, President of the Institution of Gas Engineers, deliver an address.

Before calling upon Mr. Bennett, the PRESIDENT (Mr. D. L. Copp, Exeter) presented Mr. S. Hole with the Certificate of Office and referred to the success that had attended his year of office. Mr. HOLE replied suitably, thanking the members for the loyal support that they had always accorded him and wishing the new President all success during the coming session.

The PRESIDENT said that they were very pleased and honoured to welcome the President of the Institution of Gas Engineers.

ADDRESS

By Mr. C. VALON BENNETT, President of the Institution of Gas Engineers.

It is a great joy to me to have this opportunity of addressing you, firstly because it gives me the chance of making the acquaintance of many men whom otherwise I might not have met, it also allows me to show by my presence how interested the Institution of Gas Engineers is in all matters pertaining to the Junior Associations, and thirdly it permits me to visit again that part of England which I have always regarded as "God's own Country." I nearly always spend my holidays in the West and, in visiting Bath to-day, I feel at home, for it is a district I know well because I lived, as a child, in Somerset for eleven or twelve years; and one of the first things I can remember in connection with my somewhat active career in the Gas Industry was being hoisted on the shoulder of my father and from that precarious position I endeavoured partly to charge a hot retort, in a retort house in this county, by throwing a piece of coal into it.

Somerset and other adjacent counties, with streets perhaps not quite so rowdy and busy as those near the Metropolis, breathe an air of contentment and rest to those who are compelled to spend most of their days in an atmosphere of struggle; and there is one Industry here which carries out its duties, not in a state of feverish hustle, but in a calm, deliberate, businesslike, and efficient manner. I refer, of course, to the Gas Industry. It is active and, although it proclaims itself from the housetops, yet it does not brawl. The dignity of these beautiful Showrooms, modern to the last minute, does not—although in distinct contrast with the ancient Abbey and other buildings for which Bath is noted—cause that feeling of resentment as is often the case with modern stores set in such beautiful surroundings. On the contrary, they compel the public to recognize that the Industry they represent, although well over a century old, is not hoary with age and that it has kept abreast of the times, with the result that, if people desire to get and keep up-to-date they must recognize that gas is the medium. To my mind this is a matter of great congratulation and, although proof is not necessary, it is clear that the Gas Industry in the West is led by keen men, and you who serve under and with them may consider yourselves very fortunate in that direction. Just think what your position might be if your ambition to make a good job of life was thwarted by serving persons who were moribund and cared not one iota as to the present and future. The reverse is the case; and I ask you to consider whether you are taking full advantage of your opportunities, pulling your weight, and preparing to do as well as, if not better than, those under whom you serve to-day.

I believe, with my predecessor in office, that the young man of to-day is quite all right, and that, provided he is given the chance of taking responsibilities, he will make good. Remember there is always room at the top, but no room to sit down.

I expect you are tired of hearing about the educational facilities which, if thoroughly appreciated and taken advantage of, will enable you not only to qualify for, but allow you to fill, such positions which may affect the destinies of our Industry; but they are there and it is up to you to see that you benefit thereby. The Diploma of the Institution of Gas Engineers—whether it be in Engineering or Supply—sets a seal upon the holder. It admits him to membership, which is a most coveted distinction to-day, and will, in the future, be more so. Anything worth doing is worth doing well, and believe me that something for nothing is not worth having. I can well imagine some of you saying to yourselves "My job is not in the limelight and therefore there is no need for me to strive and struggle." I also recognize that there are very few of you who look upon affairs in that manner, but to everyone may I say this—your work is of the utmost importance to yourself, your undertaking, and the Gas Industry. None of us is, of course, indispensable, but there is no reason why we should not endeavour to make ourselves so. You can move back and you can move on, but you cannot stand still.

Value of Research.

Some of you are engaged upon research work—and I envy those who delve into mysteries—and, although perhaps the results of research are not always so quickly applied as the worker would like, make no mistake about it, your efforts are of great value and will never be wasted. I believe the time is with us when Boards of Directors realize that research is not only desirable, but also a paying proposition.

I have referred to the new showrooms of the Bath Gas Company because here is striking evidence of the progress of gas; but there are many other undertakings in the West who are equally progressive; and, mark you, I realize this progress is not confined to the large concerns. I cannot, however, refrain from mentioning the Cardiff Gas Company, who are doing so much good work, particularly in regard to the use of gas for industrial purposes; and it is up to everyone in this part of the country to make the best use of the experience and knowledge of that Company.

If you were not an enthusiastic body of men it would be a reasonably easy task to say something to raise your enthusiasm, but, when you are as keen as I know you are, it is difficult to deliver myself of anything which would be inspiring; but I do say this—I and my forbears have been connected with the Gas Industry almost since its inception, and therefore I think I can claim to be able to trace the progress of the Industry for a goodly number of years. I cannot, however, remember when gas was looked upon with suspicion and as a luxury. I do, though, recollect the attitude of "take it or leave it" which was adopted by gas undertakings towards would-be consumers. Thank goodness all those days are gone. Gas is no longer suspect or reckoned a luxury. It is welcomed and recognized in home, workshop, and factory; it is a great factor in making the world a fit place to live, work, and play in. It cannot be superseded and it must progress, provided that the public is able to obtain adequate service. This service cannot be provided unless the persons who control the production and distribution are efficient.

A Bright Future.

I hold very strongly to the view that the Gas Industry has a future in front of it so enormous and widespread that its past records will, in comparison, appear insignificant. Gas is fundamentally a source of heat which can be applied and controlled at will, and it is up to us to see that the public have gas and its thousand-and-one uses brought before and demonstrated to them so as to make that clear. While we must counter the attacks which are made upon us, let our doctrine be that of pro-gas and not anti-anything. Every tub must and will stand on its own bottom, and I have no fear that the public will soon, with even greater certainty than at present, be obliged to acknowledge that gas is supreme. It is, of course, possible to "gull" people for a time, but the day of reckoning must come, and then, when it does, those who have been misguided into using a form of energy which can never be a fundamental source of heat will turn to use gas—the cleanest, cheapest, and most efficient servant the world has known. This is my belief, and I know it is shared by almost every one of you; but if there are any "Doubting Thomases" among you, I ask you to give the matter fair and unfettered judgment, and, when you have done so, if you find you cannot agree, then I say the Gas Industry has no place for you. Get out and give another a chance; but if you are with me, then work not only to repel the attacks which are being made, but counter-attack again and again until victory is ours.

Our fathers have ploughed the land and sown much of

the seed, and we now reap some of the harvest; but there is much fruit yet to be gathered, provided we do our job properly. Although some are reapers, there must also be sowers, and some of you are so engaged. See to it that you do your work well and, although you must be watchful of those who sow for another industry, you have enough work on hand not to worry unduly over their success or glory in their defeat. Be steadfast, and thus at the end of the journey you will have that spirit of contentment in the knowledge that you have run the course well, having done all you can to add to the enjoyment of mankind without having taken anything out of life except the joy of labour and service to your employer and the community in general.

Vote of Thanks.

Mr. HOLE proposed a vote of thanks to Mr. Bennett for his thoughtful and inspiring address.

Mr. S. B. JONES (Clevedon), the Junior Vice-President of the Association, in seconding the vote of thanks said that the address had done much to foster even greater interest in the Association among its members.

Mr. VALON BENNETT, in his reply, said that he was very happy to come to Bath since he had spent some twelve years as a child in Somerset. He had put much thought into his address because "what was worth doing at all, was worth doing well." Little could be said nowadays that had not already been stated in the "GAS JOURNAL" and other technical papers.

Mr. H. STANLEY TAYLOR, the Chairman of the Bath Gas Company, said that he was only indirectly connected with the Gas Industry but he found Mr. Bennett's address both interesting and inspiring. The Industry should not be content with the idea that the lighting load was gone. The lighting arrangements that Mr. Whimster had carried out in the new showrooms showed what could be done in that direction. It was nice to hear Mr. Bennett talk of Bath in such high terms.

Mr. J. WESLEY WHIMSTER, Engineer and Manager of the Bath Gas Company, said how pleased he was that Mr. Copp should be inducted at Bath since he had served as a pupil there before rising progressively to the position he now held at Exeter. He felt sure that if due note were taken of Mr. Bennett's address it would benefit everybody.

Mr. J. TAYLOR, Engineer and General Manager of Weston-super-Mare Gaslight Company, felt he would be lacking in gratitude if he were not to thank Mr. Bennett for his address. Personally, it always gave him great pleasure to do anything to assist the Association.

In bringing the Meeting to a close, Mr. COPP said that the training he had received at Bath had set a hall-mark on his career. The traditions and methods at Bath were unequalled. The Association was growing in strength and to-day he was glad to welcome two new members.

Apart from the address this meeting afforded members an opportunity of inspecting the showrooms. Tea was provided by the courtesy of the Chairman and Directors of the Bath Gas Company.

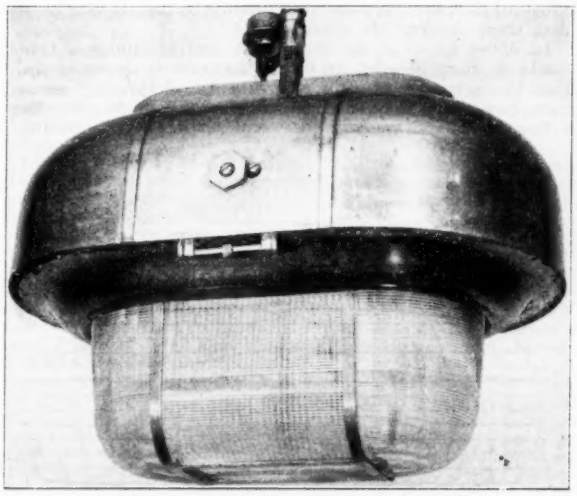
New Gas Street Lighting Fittings*

By S. English, D.Sc., F.I.C., F.Inst.P.

One of the most remarkable features of our progress in street lighting is the energetic and progressive outlook displayed by some of our largest gas companies and gas-fittings manufacturers during recent years towards the problems involved. The principles adopted in the British Standard Specification for street lighting have been regarded as favourable to electric lighting, because of the ease with which directive apparatus can be used with electricity and the comparative difficulty of using such appliances with the larger sources, such as are found in multi-mantle gas burners. At the Conference last year, there were, however, on view in Margate quite a number of reflectors and refractors of various types, each showing how designers had attempted to re-direct some of the light given by the mantles towards the area of roadway lying in between posts. In several cases developments along the lines demonstrated at Margate have proceeded during the intervening year, but such developments cannot receive here anything more than this passing notice.

Partly as a result of the Margate demonstrations, it was felt by certain members of the Gas Light and Coke Company that, though the equipment on view there showed good results so far as the roadway lighting was concerned, it was not all that could be desired. For example, is must be admitted that, in general, the improved light distribution was attained by attachments to standard lanterns, which definitely looked like additions, which did not always harmonize with the lines of the lanterns. It was felt that it would be better—from the practical as well as the psychological point of view—to design an entirely new lantern, keeping in mind from the beginning that it should have fairly strongly marked directive properties, so as to give reasonably uniform road surface illumination when installed under normal conditions. The acceptance of this conclusion facilitated a second decision—in regard to the burner. It is generally admitted that the circular arrangement of gas mantles is the best method of grouping from the point of view of total light output, but the size and shape of such a source and the type of light distribution from such clusters are not such as can be dealt with very effectively by redirecting devices built in as part of the lantern. It was therefore decided to adopt an arrangement of mantles in line or slightly staggered. On this basis a refractor of heat-resisting glass, in the form of a built-up elongated bowl, was designed, and the Gas Light and Coke Company's staff designed and produced a new type of lantern to carry this glassware.

After preliminary trials had shown sufficient promise, selected lantern manufacturers were invited to co-operate by pooling their ideas and producing a standard lantern following the lines of the original Gas Light and Coke Company model. The general lines of this lantern are shown in fig. 1 (*a* and *b*) which also gives an indication of the way in which the light from the line source of mantles is redirected. It is clear from these diagrams that the upwardly and horizontally emitted light from the mantles is refracted and redirected into a path about 15° below the horizontal. The light emitted below the horizontal is less strongly refracted and is to a certain extent diffused by means of prisms with curved faces. These centre panels may have smooth surfaces on the inside as indicated in fig. 1 (*a*) thus producing axial directional effects, such as are required for central mounting or for relatively narrow streets at wide spacings, or they may be had with vertical redirecting prisms giving a 10° bias to the main beam such as is required for ordinary side street mountings. An isocandle diagram derived from measurements on one of the early lanterns using axial glass panels is given in fig. 2. The lantern had eight bijou mantles slightly staggered and had a gas consumption of 16·18 c.ft. per hour. The diagram



A Photograph of the Lamp described by Dr. English.

It is the co-operative production of three makers—Messrs. W. Sugg & Co., Ltd., William Edgar & Son, Ltd., and W. Parkinson & Co. The glassware has been specially designed by Messrs. Holophane, Ltd.

* From a paper at the Eleventh Annual Meeting and Conference of the Association of Public Lighting Engineers, Sept. 17 to 20, 1934.

indicates that the lantern produced a fan-shaped beam with a maximum intensity of 1,735 c.p. at 75° from the vertical. The re-entrant portions of the 300 and 400 c.p. contours have since been smoothed out. With such a strongly marked maximum on the candle-power curve it is feasible to space out these lanterns wider than it is safe to do with

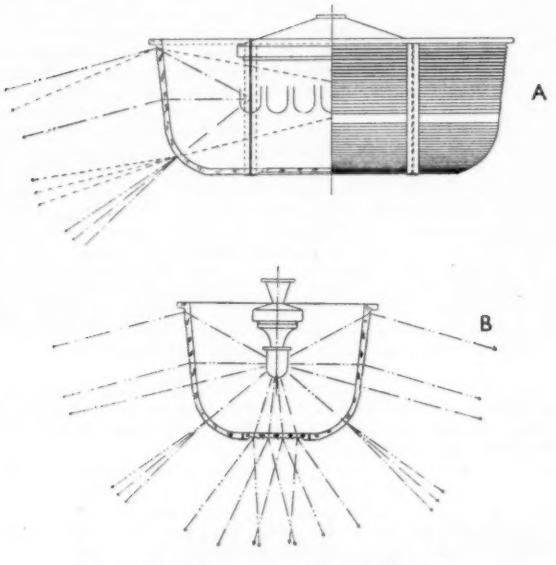


Fig. 1.—Prismatic Glass for Linear Gas Mantles.

lanterns with less strongly marked light redirecting characteristics, as shown by the following data.

TABLE I.—*Spacing and Gas Consumption for Classes E and F Streets.*

Class of Street.	Mounting Height. (Ft.).	Spacing. (Ft.).	Spacing/Height Ratio.	Gas Used per Hour per 1,000 Sq.Ft. of Roadway.
			Approx.	C.Ft.
E	21	121	5 : 1	3·3
F	18	141	8 : 1	2·8

When it is remembered that wide spacing and low gas consumption both represent economy in use, it will be seen that these figures are encouraging.

In order to show the light distribution along a typical roadway more clearly, an isolux diagram is shown in fig. 3. For the purpose of this diagram the following assumptions have been made: Mounting height, 20 ft.; overhang, 6 ft.; width of roadway between curbs, 40 ft.; width of

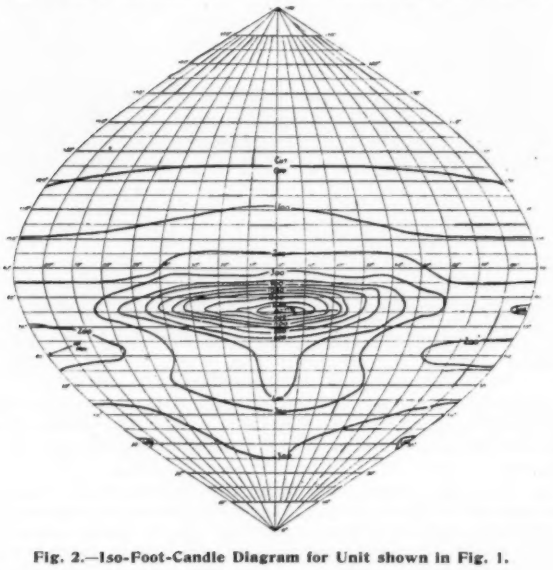


Fig. 2.—Iso-Foot-Candle Diagram for Unit shown in Fig. 1.

footpaths, 10 ft., making a total road width of 60 ft. One rather interesting feature of this diagram is the way in which the isolux lines run practically parallel with the curb on the side of the road away from the lamp, thus indicating a very uniform illumination all the way up that side of the road.

A trial installation of six of these lamps has been arranged in London, but it is too early yet to come to any conclusions concerning them. It is probable that with further experience with this new lantern, it will be possible to improve on the present performance, perhaps by obtaining an improvement in the general performance of the lantern, and perhaps by some modification of the light distributing prisms on the glassware.

On the continent the latest developments in gas street lighting appear to be extensions of ideas that have been in use here for some considerable time. In the first place, there is a new type of pear-shaped globe which carries the idea of our half-frosted globe a stage further than we have gone. This new globe has the shape of an elongated pear, and consists entirely of diffusing glass, but for a narrow ring of clear glass near the top. As a result of this construction all the light emitted from the burner is diffused except that which is emitted in the neighbourhood of the 75° angle, and a very nicely shaped polar curve is produced. Unfortunately, however, the polar curve of the light distribution of the bare source is not given, so for comparison purposes, the corresponding curve of a British 6-mantle lamp has been recalculated to Hefner candles. This comparison indicates quite clearly that the attractive shape of the polar curve given by the new globe has been obtained by a very heavy light absorption, since the British "bare lamp curve" everywhere lies outside the curve given by the German lamp with its special globe.

The second interesting idea that is being developed in Germany is the use of a silvered glass, elliptical reflector, in the form of a tilted dome. This is only suitable for lanterns carrying up to 4 mantles. From its contour it is obvious that with a single or small clusters of mantles it will be fairly effective in spreading the light up to about 70° from the foot of the post, but the light will be strictly

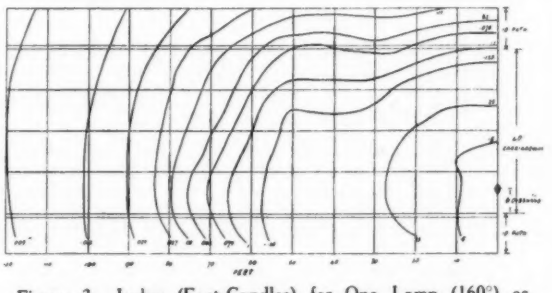


Figure 3. Isolux (Foot-Candles) for One Lamp (160°) as Figure 1. 40 Feet Carriage Way. 6 Feet Overhang.

localized to the length of roadway covered by this angle. This latter is a feature which is not in favour in this country.

Discussion.

Mr. F. A. C. PYKETT (Coventry) asked if consideration had been given to the use of prismatic glass with high pressure gas lighting. The light source from high-pressure gas was very similar to that from the electric discharge lamp.

Mr. G. BRAIDWOOD (Coatbridge, and also representing the National Gas Council) inquired of the author why volumetric comparisons had been given in the paper in the case of gas having regard to the fact that the Gas Industry abandoned these fourteen years ago when it adopted the therm. He was referring, he said, to the consumption of gas in the lamp with which the Gas Light and Coke Company had been experimenting.

Mr. F. C. SMITH (Gas Light and Coke Company) remarked that some advocated a high-intensity beam near the horizontal, while others deprecated the use of such a beam, but, after all, what was glare? In spite of the difficulties which might be presented by the size of the course or the geography of the source of light, the makers of refracting glassware and reflectors could give lighting engineers practically the distribution they required. It was a great thing to know that when lighting engineers had made up their minds what they really wanted there was a scientific reserve in this country which could supply their needs.

Dr. ENGLISH, replying, remarked that Mr. Smith and the Gas Light and Coke Company were responsible for the form in which the information referred to by Mr. Braidwood appeared in the paper, as it was supplied to him in that way. As to the use of prismatic glass with high-pressure gas, it was difficult enough to get prismatic glass to stand up to ordinary low-pressure gas, and he was not able to put anything forward in connection with high-pressure gas. Dr. English agreed with Mr. Smith that when street lighting engineers made up their minds what they wanted, their needs could be met; but so long as one street lighting engineer wanted one thing and another something quite different, and a third one something different again, the manufacturers were in a very awkward position.

Solihull Gas Order

A Special Order, promoted under the Gas Undertakings Acts, 1920 and 1929, by the Solihull Gas Company, was the subject of inquiry by Mr. J. F. Ronca, O.B.E. (Director of Gas Administration, Board of Trade), at the Westminster Offices of the Board on Tuesday, Oct. 2.

The main proposals are the acquisition by the Solihull Company of the Knowle and District Gas Company, Ltd. (a non-statutory undertaking), the extension of the Solihull Company's area of supply, and the adoption of the basic price and basic dividend system.

The objectors were the Birmingham Corporation, who contemplate an extension of gas limits to include certain areas now proposed to be taken over by the Solihull Company, and, therefore, ask that those areas should not be given to the Solihull Company; and the Stratford-on-Avon and Meriden Rural District Councils, who ask that the parishes concerned should not be included in the Solihull Company's area, but should be supplied by the Birmingham Corporation.

The terms agreed upon for the acquisition of the Knowle Company by the Solihull Company are scheduled to the Order. As part of the consideration, £7,150 of the preference shares of the Solihull Company, carrying a maximum dividend of 5%, shall be given in exchange for the £5,500 nominal value of 6½% preference shares of the Knowle Company; and £15,425 nominal value of the 5% ordinary shares of the Solihull Company shall be given in exchange for the £5,800 nominal value of ordinary shares of the Knowle Company.

There are the usual provisions for compensation. The amount to the Directors of the Knowle Company, for loss of office, is £1,050; the compensation to the Manager of the Knowle Company (Mr. Frank Hornby) is £1,130; and to the Auditors, £31 11s. 6d.

Mr. A. J. Lees (Messrs. Lees & Co., Parliamentary Agents), who appeared for the Solihull Company, said the amount of the Directors' compensation was calculated on the seven years' basis. The transfer was to take effect as from Jan. 1, 1935, and was subject to the £2,100 debentures of the Knowle Company and any bank overdraft being discharged by the Solihull Company.

With regard to the price of gas, it was agreed that the Special Order promoted by the Solihull Company should provide that the price to be charged to consumers within the Knowle Company's area may exceed the price charged within the Solihull Company's existing area by not more than 1·60d. per therm.

The Order also proposed that there should be a basic dividend, instead of a maximum dividend, of 5%. The basic price proposed was 10d. per therm. Power to raise additional capital was also proposed.

Mr. Lees emphasized that there were no objections to the purchase or to the agreed terms.

Birmingham Supplies in Solihull Area.

Dealing with the relations between the Solihull Company and the Birmingham Corporation, Mr. Lees said that from 1899 to 1930 various agreements were made whereby the Birmingham Corporation should supply gas in certain areas within the limits of supply of the Solihull Company, but which the Solihull Company were not, at the times of the agreements, in a position to supply. While the agreements were *ultra vires*, they were made in good faith by both parties; and they indicated the reasonableness of the Company. On Jan. 9, 1934, the Corporation had applied for a Special Order to extend their limits of supply, and to include within their statutory limits, together with other areas, those areas which they had been supplying by agreement with the Solihull Company. The Solihull Company had not opposed the Corporation's proposals, and the Corporation's Order was approved as recently as July 31, 1934.

But before the Birmingham Order was actually approved, the Corporation had deposited objections to the Solihull Company's present Order, intimating that they wanted also to take over part of the area which the Solihull Company were asking to be added to their area of supply. He believed this was the first case in which any gas undertaking, having applied for an Order extending its district, opposed another application before its own had been granted and said that it wanted something more than it had applied for a few months previously. The Corporation were asking that part of the urban district of Solihull (which was transferred thereto from the parish of Elmdon by the Warwickshire Review Order, 1932), and parts of the parishes of Bickenhill and Hampton-in-Arden (in the rural district of Meriden), and the parish of Tanworth (in the rural district of Stratford-on-Avon) should not be included in the Company's area of supply. The Corporation, said Mr. Lees, had not laid any mains in the areas for which the Company were asking.

In the Corporation's objections it was stated that it was their intention in the near future to apply to the Board of Trade for a Special Order extending their limits to include parts of the rural district of Meriden in which the Corporation's mains had already been laid. That was very proper; but it had nothing to do with this case. Why had not the Corporation provided for that when they had made application for their Special Order on Jan. 9 of this year? In addition, it was stated, they intended to ask for other parts of the rural district, including the parishes of Bickenhill and Hampton-in-Arden, and were willing to extend their mains further into the rural district. They had stated also that the approval of the Company's proposals in regard to Bickenhill and Hampton would preclude the Corporation from laying mains in the two main thoroughfares—the Birmingham-Coventry road and the Coleshill-Kenilworth road—thus preventing the Corporation from adequately and economically supplying gas to other parishes in the Meriden rural district. But Mr. Lees urged that a provision could be made enabling the Corporation to lay mains in those roads.

It was submitted by the Corporation that the Company would not be able, for a considerable time, to supply gas in the whole of the area they were asking for by the present Order, and that some of that area should be included in the Corporation's gas limits. It seemed, he commented, that they could not have thought that on Jan. 9.

Bulk Supply.

Formerly the Solihull Company had obtained a bulk supply from Birmingham, for supplying part of their area, but that agreement had recently been concluded, and the Solihull Company were making that gas.

The Company had expressed their willingness to discuss with the Corporation any area in the parish of Bickenhill, abutting on the Birmingham-Coventry road, in which at the date of the application for the Company's Order the Corporation had laid mains. But they would strongly object to delete from the proposed limits the whole of the parishes of Bickenhill and Hampton-in-Arden, which could be supplied more conveniently by the Company than by the Corporation. Although he contended that the Corporation had not the right to oppose the present Order, the Company were willing to concede to the Corporation the road in question.

Another bombshell had been dropped on Sept. 26—nearly three months after the date for depositing objections had expired—when the Corporation had written to the Board of Trade and to the Company objecting also to the inclusion within the Company's area of the part of the urban district of Solihull as was within the parish of Elmdon, and also part of the parish of Tanworth. He supposed the Corporation had felt they could not expect to secure Bickenhill if they did not object also with regard to these later areas. They wanted to come within 200 yards of the Solihull gas-works, and were proposing to make a circle around the Company's area.

He submitted that, under the terms of the Gas Regulation Act, and the rules governing the inquiries, the Board of Trade was precluded from hearing the later objections made by the Corporation. And further, he urged that, but for the vacation, the Company's Order would have been made already.

Also, he contended that the Corporation had no *locus standi* in respect of the first objections, lodged on July 9. They could not have gone to Parliament, he said, with a plea that in the near future they would be making an application for parts of the area now sought by the Company, but that they did not quite know what they would apply for. They had no competing application, and they had no mains in the areas in respect of which they were now objecting. It was up to the Corporation, as soon as they had seen the Company's notice in respect of the present Order, on June 9, to put in a competing application; but they had not done so. This was an important point of principle.

In the objections of the Meriden Rural District Council it was stated that the rural district was situated between Birmingham and Coventry, and that agreement had been made between the Rural District Council and the Corporation by which the Council were to give the Corporation the necessary facilities for supplying gas within the rural district on certain terms and conditions, and the Corporation would supply there on the demand arising. (It was outside the Corporation's statutory area of supply.)

In the objections of the Stratford-on-Avon Rural District Council it was stated that the 1934 Draft Order of the Corporation had provided for the inclusion of part of the parish of Tanworth within the Corporation's limits of supply. The Council had objected, on the ground that the whole of the parish should be included, and the Corporation had agreed to consider, at the proper time, a further extension of limits, to include the whole of the parish. The Solihull Company now wished to include part of the parish in their limits of supply. If the present Order were granted, Tanworth would be divided into three sections—one within the Corporation's limits, one within the Solihull Company's area, and one without a supply.

Mr. Lees said that the Company had conceded to the Corporation part of their original statutory area in Tanworth. The parish comprised over 6,000 acres, and there was nothing unusual in such a parish being within the limits of supply of two, or even more, undertakers for the supply of gas, water, or electricity.

A Question of *Locus Standi*.

Mr. H. Wentworth Pritchard (of Messrs. Sharpe, Pritchard & Co., Parliamentary Agents), who appeared for the Birmingham Corporation, dealing with the suggestion that the Corporation had no *locus standi* to appear in opposition, said that the Company should have raised that point when the Corporation had at first lodged objections. But, with regard to the merits of the Company's contention, he said that, under the Special Order procedure, applications for Special Orders could be made

at any time, and the chances of having two competing applications deposited at the same time were remote. Again, if one gas undertaker were considering applying for an extension of limits, and another undertaker knew that, the latter need only slip in an application for extension first. Surely it would be unfair if the first undertaker were ruled to be completely out of court because he had not actually lodged his application. It was in the interests of the consumers that the Board of Trade should consider competing schemes.

With regard to the objections made on Sept. 26, he apologized for any inconvenience that might have been caused. The facts were, however, that in July the Corporation had not all the information they wanted in regard to their own proposals, but as time passed they had appreciated that their proposed application for extension must include the whole of Tanworth and a portion of Solihull; and they were making application to the Board of Trade to include those areas in the Birmingham limits. In those circumstances it was considered fair to object to the Company's present Order; and he submitted that the Board of Trade could exercise discretion as to whether or not it would hear the objections.

Mr. LEES, replying to the criticism that the Company did not object in the first place to the Corporation being heard, said the Company had been led to believe that the Corporation had already laid mains in the areas concerned. But it was now ascertained that the Corporation had no mains or consumers there, and, therefore, they had no interest in those areas, unless they had deposited a competing application.

Mr. RONCA said he had to consider objections on behalf of "persons appearing to be affected." He was impressed, however, by the Company's submissions.

(During the luncheon interval, Mr. Ronca conferred with his colleagues, and it was decided that he should hear the Birmingham Corporation with regard to the objections proper, but not on the later objections.)

Evidence.

Mr. *George Evetts* (Consulting Engineer) gave evidence on behalf of the Solihull Company, and said that the Company had supplied gas at two points outside their statutory area of supply, at the request of the consumers there. Practically the whole of the Company's existing statutory area was adequately supplied. They were now applying for the addition of the Knowle Company's area, plus districts adjacent to the existing areas of the Solihull and Knowle Companies, and he believed that in these additional areas the Company could supply adequately and give reasonably good services. The Solihull Company were enterprising, and their works were up-to-date. The Knowle works, which it was not proposed to close down, could be made to double its present output, with very little additional expenditure. He submitted tables, which showed that the development of the Solihull Company had been rapid, the output increasing from 12·8 million c.ft. per annum in 1903 to 131·2 millions per annum in 1933. The proposals in the Order were wise, particularly as the area between the two companies was rapidly filling up. The transfer terms were reasonable to both Companies, and the Solihull Company were not buying an undertaking in which the expenditure during the next few years would be so high that the maintainable profit would be less than formerly. The Knowle Company had been paying 10%, free of tax, for many years, and were contemplating paying more. No objections had been raised to the transfer by any of the local authorities, or anyone else, in the Companies' areas.

The combined output of the Solihull and Knowle Companies was 155 million c.ft. per annum, and that was large enough to justify a departure from the maximum price basis.

The making of gas to replace the amount that had been bought in bulk from Birmingham for supply to part of the area had meant a saving of £290 a year, after paying the interest on capital. The change had been made, however, because the Company felt that they could satisfy the consumers better with regard to pressure, though there was no complaint against the Birmingham bulk supply.

The price of gas in the Solihull Company's area was 9·8d. per therm, and there was practically no discount. By the agreement, there was to be a differential price of 1·6d. per therm in the Knowle Company's area, but that differential was not compulsory. The present price of gas in the Knowle area was 4s. 6d. per 1,000 c.ft., less 3d. discount for prompt payment—*i.e.*, 4s. 3d. net, for 450 B.Th.U. gas, equivalent to 11·4d. per therm. Under the terms of the Order, the consumers in the Knowle area would still be supplied at the equivalent of 4s. 3d., whether they paid promptly or not. The effective reduction of price in the Knowle area would be 2d. per 1,000 c.ft., or 0·4d. per therm.

The proposal which had been made to Birmingham Corporation, that they should supply the frontages on the Birmingham-Coventry road, would have been a good settlement, because the Corporation should be able to supply there at a better price than could the Solihull Company.

The Solihull Company could give the village of Hampton-in-Arden as good a supply, as good a service, and as good a pressure as could the Birmingham Corporation. The Company's mains were nearer, and the Company were willing to be placed under obligation to lay a main to the village within 12 months from the date of the Order. If the Corporation were proposing to sell gas there at 7·8d. per therm (the same price as within the city of Birmingham), as against the Solihull Company's price of 11·4d., of course, the consumers would get better terms. But the Corporation could not supply there at 7·8d. per therm as an economic proposition. On the other hand, if the Corporation intended to supply Hampton only when that supply became an economic proposition at 7·8d. per therm (as suggested in the objections), then they would not supply there for years.

Originally, there had been objections to the Company's proposal to charge a still higher differential in the added areas outside the Knowle area, but that proposal had been withdrawn, and it was now proposed to have only one differential, applying to the Knowle area and the other areas proposed to be added.

Cross-Examination.

Cross-examined by Mr. Pritchard (for the Corporation), Mr. Evetts said it would be no use offering, on behalf of the Solihull Company, to supply the added areas at the Solihull price.

Mr. PRITCHARD said that in February, 1933, the Corporation had told representatives of the Company that they were promoting an Order asking for part of the Company's area, and also that they were contemplating a second Order to take into the Corporation's limits areas which were not within the limits of any undertaking.

Mr. *Evetts* said he had not heard of the second proposal.

Mr. PRITCHARD pointed out that the extension the Company now asked for comprised an area about two-and-a-half times that of their present limits. He recalled, however, that the Company's original statutory area had been too large for the Company, as shown by the various agreements made with the Birmingham Corporation for the supply of parts of that area from time to time; and he asked if Mr. Evetts had considered that the same position might arise in the future in respect of the areas now asked for.

Mr. *Evetts* said it was possible. With regard to Hampton-in-Arden, however, had he been told before that Birmingham contemplated applying for that area, that fact would not have made the slightest difference to his advising the Company to go on with their application.

He would not say that the Company could do as well as the Corporation for a large industrial consumer; but it could do as well for ordinary consumers, including the provision of a night service.

Mr. NORMAN A. CARR (for the Stratford-on-Avon R.D.C.) asked whether the Birmingham Corporation could satisfy the consumers in Tanworth better than could the Solihull Company.

Mr. *Evetts* agreed that the consumers would gain in respect of price, and would not lose in other respects.

Mr. CARR said that Birmingham had taken over part of the parish, the Solihull Company wanted another part, and a third part—which was the most likely to be developed—would be left without a supply if the Company's proposals materialized. Further, inasmuch as the area sought by the Company was between the other two parts, the Birmingham Corporation, who were willing to extend, could not extend their mains.

Mr. *Evetts* agreed that, under the present proposals, the Birmingham mains would have to pass through the Company's area; but he personally would be prepared to give the Corporation contact between the two parts on either side of the Company's territory.

Mr. CARR asked when the Company proposed to supply in Tanworth.

Mr. *Evetts* replied that that would be done when it became an economic proposition; but definitely not at the moment.

Mr. CARR said the Company wished to take a large amount of country and hold it for a number of years in the hope that development would in due course make it worth while to supply.

Mr. *Evetts* replied that it was the invariable procedure; and it had been a surprise to him that Birmingham had proceeded in the opposite way—*i.e.*, by getting into an area first and then applying for it. However, if he were in the position of the Board of Trade, and there was a concrete proposal put forward that the Corporation would supply there at once and the Solihull Company might supply later on, he would not hesitate to give the area to the Corporation.

Mr. RONCA pointed out that Parliament had placed a limit of five years on this "dead-hand business."

Mr. CARR said it might be that the Company would want to give up the Tanworth area after a time.

Mr. *Evetts* replied that probably they would.

Re-Defining Limits.

Mr. H. WENTWORTH PRITCHARD, addressing Mr. Ronca on behalf of the Corporation, explained that it had been found necessary for the Corporation to re-define their limits of supply, largely as the result of alterations in local government boundaries. Secondly, they wanted to make adjustments with a number of neighbouring statutory gas undertakers, in whose areas the Corporation had been supplying by agreement. And thirdly, they wished to include within their limits certain areas not yet within any statutory gas supply areas. It was decided that it was most convenient to promote one Order to deal with the first two matters; that Order came into operation about two months ago. The intention was to promote another Order for the third matter, and they had been negotiating with the local authorities in areas around the Birmingham limits, and also with statutory undertakers whose limits were anywhere near those areas. That was why the application for the second Order had been postponed. To date, they had practically reached agreement all the way round, and application for an Order would be made very shortly. The Corporation had made it clear to the Company's representatives that they intended to promote the second Order to take in non-statutory areas,

and he was surprised, therefore, that the Company had instructed their agents to make such a grievance of the matter.

The Company had obtained statutory powers in 1886, and had since transferred about one-third of their original area to the Corporation for gas supply. Yet they were asking by the present Order for an area to be added comprising 270% of their present area. The proper thing to do was to give the areas to undertakers who were likely to develop them.

The Corporation could not accept the Company's offer of the frontages on the Birmingham-Coventry road; in the Order to be applied for the Corporation were asking for a large part of the Meriden rural district; that road would be used for mains, and in order to make it a paying proposition it was necessary to be able to supply to the north and the south. It was the intention to supply gas at the same price in the added areas as in the city of Birmingham. So that from the point of view of the price of gas, the evidence was clearly in favour of giving the Corporation the areas they asked for; they could provide adequate pressure; they could afford a better service than the Company; and, in view of their resources, they could afford to provide an unremunerative main for the time being.

The two witnesses called on behalf of the Corporation were Mr. J. Hewett (Distributing Engineer) and Councillor R. H. Hume, M.A. (Chairman of the Gas Committee).

A number of questions were put by Mr. Lees to Mr. Hewett with regard to the supply in Hampton-in-Arden and Bickenhill. Witness said he had estimated that the cost of the mains would be £7,500, and, from his experience in similar areas, he estimated a demand of 7 or 8 million c.ft. per annum, though he had not made a canvass. Mr. Lees was critical with regard to the Corporation's ability to supply these areas economically at 7·8d. per therm (as it was proposed to do), and he pointed out that the expenditure in respect of the mains only would amount to £1,000 per million c.ft. sold per annum.

Questions were also asked as to a meeting at which the Corporation's representatives had discussed the matter with the Company's representatives, in February, 1933. Mr. Hewett said it was pointed out that the Corporation intended to ask for a large part of the area, but that the details were not discussed.

Councillor Hume said that the problem of extending the gas limits had been under consideration for 18 months, and was in the hands of a sub-Committee of the Gas Committee.

When he disagreed with Mr. Evetts' view that a supply in Hampton at 7·8d. would not be economic, Mr. Lees pointed out that the outstanding debt on the Corporation Gas Undertaking was equivalent to 9d. per therm sold, and that the cost of mains for the Bickenhill and Hampton districts would be £1,000 per million c.ft. sold per annum. But Councillor Hume emphasized the developments in those areas, and said that even if there were a loss in the first three years the demand would increase.

In the Interests of Consumers.

Mr. Norman Carr (for the Stratford-on-Avon R.D.C.), in his address to Mr. Ronca, emphasized that the opposition to the Company's proposals in respect of Tanworth, and the wish that the supply should be given by the Corporation, had been made purely in the interests of the consumers. He suggested that the Company's record was not a very good one, in that they had given up a large part of their area to the Corporation voluntarily; yet they now sought to take over a very large area which he suggested they would not be able to supply. If the parish of Tanworth were split into three parts as now proposed, and two parts were supplied by different undertakings at different prices, there was likely to be difficulty. On the other hand, there was an undertaking from the Corporation that they would consider—and he believed he could say that they would ask for—an Order allowing them to supply the whole of Tanworth. They could supply good gas, considerably cheaper than that from the Solihull Company, and the Rural District Council knew that the Corporation's service was good. Therefore, he asked that the Board of Trade would not allow Tanworth to be taken over piecemeal, and partly by a small undertaking whose representative had said they might not lay gas mains for a long time, and perhaps not at all.

Mr. Lees asked to see the undertaking said to have been given by the Corporation to take over the Tanworth area.

Mr. Carr read a communication to the effect that the Corporation were considering an additional Order for extending further, and the proposals included any part of the parish of Tanworth. It was clear, he said, that Birmingham was prepared to undertake the work.

Mr. A. W. Liggins (Clerk to the Meriden R.D.C.), in a brief address to Mr. Ronca, said all the evidence emphasized that the areas under discussion, in the Meriden rural district, should be served by the larger and more resourceful undertaking, which had rendered great service in the district in the past. He had letters from the Hampton and Bickenhill Parish Councils supporting the Rural District Council's attitude.

Fish Frying de Luxe.

Gas Assists New Venture.

A short time ago, Mr. Claude Hulbert, the famous comedy star, and Mr. Harry Longhurst, who is making a name for himself in the same profession, decided that the fried fish trade offered great possibilities provided it was exploited on novel lines, and they approached the Gas Light and Coke Company, in their pursuit of new ideas. Their scheme was that all the cooking should be done on a range mounted in the window in full view of the public, and it was essential that steam and the smell of fat should not escape into the restaurant. It appeared, therefore, that specially ventilated pans were desirable.

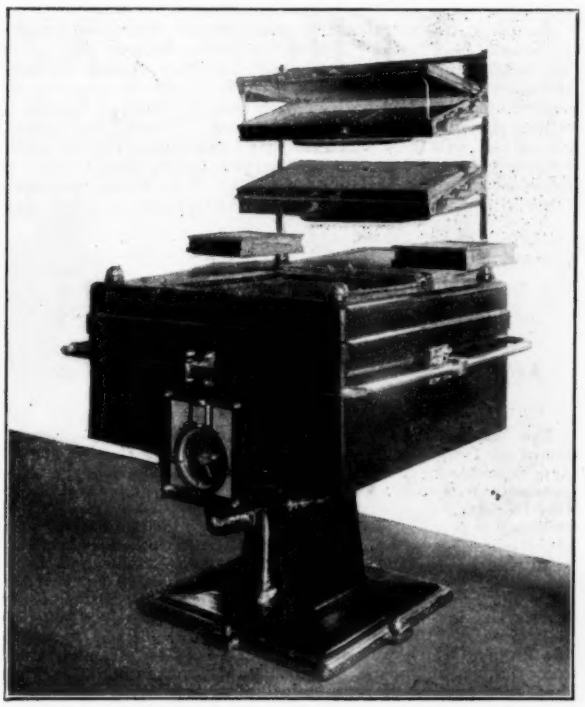
It was decided by the Industrial Section at Watson House to proceed at once with the design of an entirely new range, and as a result the G.L.C. Pedestal Fish Fryer was produced. The main characteristic of the range is that it is made to stand clear of any wall, with no visible flue connections, as shown in our photograph, the flue gases being withdrawn by a fan through the base of the range and the gas supply also being accommodated within the pedestal. The range is finished in black vitreous enamel with chromium-plated fittings, and is surmounted by a set of chromium-plated boxes in which fish and chips can be kept hot and crisp for serving. Each box is heated by four Star burners.

The firing consists of a standard Davis burner, and in respect of thermal efficiency no advance on previous practice is claimed, the main advantage of the range lying in its great publicity value. The exhaust duct, which is easily regulated by leaf dampers, removes not only the flue gases, but also the steam and vapours rising from the pan, and even when a load of chips is inserted in the hot oil no steam is seen to escape. The entire absence of the usual smell is one of the most striking features of the installation.

Two ranges of this type have already been installed and a third is on order.

The venture has proved a huge success and already the question of increased accommodation in the restaurant has become pressing. The restaurant is heated by a panel gas fire which completely harmonizes with the decorative scheme. We understand that this shop in Uxbridge Road is the first of a chain of similar establishments.

Newspapers connected with the fish trades have commented most favourably on this novel range, which has brought excellent publicity for gas. The following, taken from the *Fish Trades Gazette*, is but one example: "The departure of frying the fish and chips in the shop window is a significant one, but it requires the utmost hygiene and cleanliness, and that is, partly, why gas must be the fuel. Coal, coke or breeze would nullify the effect; if you used either of these fuels you would inevitably show the public an element of dirt and dust; and you cannot afford to display *that* in a shop window. The only other fuel would be electricity, but this has yet to be made a commercial proposition for the frying trade. And so we have a fresh example of the advantages of gas, for what fryer does not know its cleanliness as a fuel and its ease of control?"



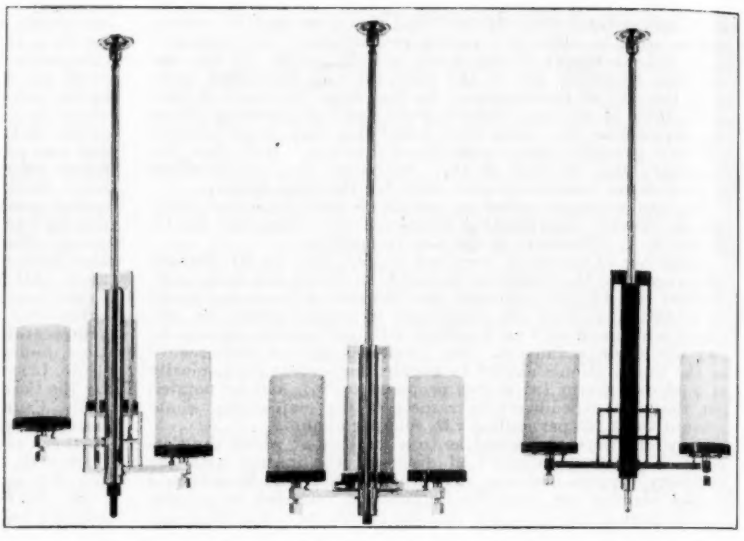
The G.L.C. Pedestal Gas Fish Fryer.

Holding the Lighting Load

Some Interesting New Fittings

The value of the lighting load to the Gas Industry has been stressed many times in the past, and with the approach of another lighting season the problem of stemming the inroads of our competitors into a field that was once exclusively gas comes up once more for serious consideration.

It is unfortunately a fact that much lighting, both domestic and industrial, has in recent years passed into other hands not so much by reason of any inherent superiority of competitive methods, but often as a result of the relatively high price at which undertakings have been forced to sell the more attractive types of fitting which are so much in vogue at the present time. It was therefore with the object of placing the Gas Industry in a position to supply really beautiful and utilitarian lighting fittings at a figure within the scope of every purse that Messrs. Falk, Stadelmann, & Co., Ltd., invited us recently to inspect at first hand some of the latest lighting fittings at their Farringdon Road Showrooms. And, indeed, very remarkable strides are being made in this field. These fittings indicate that gas is as applicable to contemporary interpretation of up-to-date lighting, so far as form and character are concerned, as the most modern electrical units.



Examples of up-to-date gas lighting fittings by Falk, Stadelmann, & Co., Ltd.

Dealing first with the firm's fittings recently introduced more particularly for shop, office, or factory lighting, there is the Veritas "Lustralite" pendant, which embodies a new form of bowl supported by three chromium-plated rods from the main pendant, thus dispensing with the usual chains. The bowl is of novel construction, being of opaque glass above, with a prismatic glass bottom, which has the effect of producing a brilliant yet well diffused light. The fitting is, of course, switch controlled and has the advantage of being entirely free from unsightly lever arms or other appendages.

Another unit particularly suitable for commercial application is the Veritas "Spherelite," which is of very pleasing appearance. The outstanding feature of this fitting is the fact that the burner is provided with a specially designed rustless steel gallery with four protruding flanges on which the globe is fitted or removed by tilting at a given angle. It will thus be appreciated that there are no screws required to cause breakage to the globe, which may be knocked or pushed without any risk of its being displaced. Only tilting at the given angle will release it. The light from this fitting, which may also be switch controlled, is pleasingly mellow, four different shades of opal spherical bowls being available—namely, champagne, yellow, light green, and light blue.

Finally, we may turn to the domestic side, and here Messrs. Falk, Stadelmann, & Co., have produced a new type of decorative fitting which is truly worthy both of the makers and the Gas Industry. The accompanying illustration tells its own story of the remarkably attractive appearance of these units, which are manufactured in two and three burner sizes in chromium plated and coloured relief pendant and wall bracket forms. Red, black, and green colours are available, and the staggered form of the three burner units is particularly striking. The globes are of heat-resisting "Pyrex" glass, while a noteworthy feature is the taps below each burner, shaped to match the fitting and hardly recognizable as such.

These units should prove of considerable interest to the Industry and should do much to foster the valuable lighting load this coming winter.

Gas Regulation Acts.

Application for Special Order by Mansfield Corporation.

The Mansfield Corporation having made application to the Board of Trade for a Special Order under the Gas Regulation Acts to enble it to take a bulk supply of coke oven gas, and generally to bring up-to-date the legislation under which its Gas Department now works, five objections were lodged in the ordinary course, but as the result of negotiations four of these objections were withdrawn. The fifth objection, however, from a Mr. Norris—a former member of the Corporation and at the moment an employee of the Corporation—was sent in in writing with the request that it should be considered, although Mr. Norris was unable to appear or to be represented. Under the Act, of course, this must be done, and the result was that when the inquiry which was ordered to be held on Friday, Oct. 5, came on, no opponents put in an appearance, but there were present a number of representatives of the Mansfield Corporation, of the Grassmoor Colliery Company—from which the Corporation proposes to take a bulk supply of coke oven gas—and of Sutton-in-Ashfield, one of the bodies which had previously objected but had been satisfied, their appearance being due to a desire to see that no alterations were now made which would affect the arrangement come to. Among those present was Mr. J. Gibson, the Mansfield Corporation Gas Engineer, and Mr. J. Pollard, Chairman of the Mansfield Corporation Gas Committee.

Mr. J. F. Ronca (Director of Gas Administration) apologized to the parties for bringing them all the way to London in such circumstances. At the same time he explained that he had no alternative to holding the inquiry, as a letter he had received from Mr. Norris made it clear that he had not withdrawn his objection.

Mr. Alfred Briggs (Chairman of the Sutton-in-Ashfield Council Gas Committee) complained that a large number of business men should be brought to London in the way they had been at considerable expense because of an objection lodged in the circumstances that had been mentioned.

Mr. L. Pepper, Solicitor and Clerk to the Mansfield Corporation, explained that Mr. Norris complained that in his view the Corporation was handing over its gas undertaking to a private company, which, of course, was not the fact at all.

Mr. *J. A. Beck* (Mayor of Mansfield) gave evidence in support of the application and urged that the great advantage of the present proposal was that the capital expenditure would be £20,000 less than if the existing works were reconstructed. Referring to the objection of Mr. Norris, he said that Mr. Norris was not familiar with the mass of detail that had been gone into during the past five or six years, as he had not been on the Council since 1928. He added that Mr. Norris was an employee of the Council at the present time, being a school attendance officer, and the suggestion that the Corporation was handing over its gas undertaking to a private company was without foundation. The only effect of the agreement was that the Corporation would cease to manufacture gas itself in the future.

This closed the inquiry and the Director will report to the Board of Trade in the usual way.

Gas Undertakings' Results.

Greenock.

The record make of gas at Inchgreen during the past year is reflected in the financial results of the Greenock Corporation Gas Undertaking, which shows a gross profit of £19,893 and a net profit of £3,320 on the past year's trading. These figures compare with £23,818 and £3,497 respectively for the previous year. A factor which contributed largely to this satisfactory result was that although the make of gas was increased by 18 million c.ft., or 2·7%, the net cost of production was only increased by £574, or 1·4%. A contribution of £2,000 was voted to the consolidated rate fund from the profits due to the year 1932-33. The amount actually brought forward in net revenue account was therefore £1,497, which, together with the profit of £3,320 due to the past year's working, leaves a credit balance of £4,817 to be carried forward to the current year's account. The Gas Engineer's estimates for the current year, which have been homologated by the Corporation, include a further contribution of £2,000 to the consolidated rate fund, a 5% reduction in the price of gas supplied to the Public Lighting Department, together with a slight modification of the scale of charges applying to consumers through ordinary meters, which will mean a saving of approximately £2,500 to consumers in a full year.

Kendal.

There was a gross profit for the year on the Gas Undertaking of £9,273, and, after paying interest, sinking fund, income-tax, and bank charges, there remained a net profit of £2,059. Capital expenditure during the year on new mains, meters, and cookers amounted to £2,066. There was an increase in the gas made of 850 c.ft. per ton, or on the quantity of coal carbonized of 5,576,000 c.ft. The quality of the gas delivered was 453·2 B.Th.U. against a declared calorific value of 450 B.Th.U. The total gas made totalled 140 million c.ft., which shows an increase over the last year of about 7%. The number of consumers now totals 5,440, being an increase of 97. The number of cookers in use amount to 3,500, or 295 more than last year. Gas fires, geysers, hotplates, radiators, and washboilers have been fixed in considerable numbers during the year. The receipts from coke showed an increase of £94. The manufacture of gas still holds its own as an agent for street lighting, and additional lamps are erected each year.

Middleton.

The annual report of the Middleton Corporation Gas Department for the year ended March 31, 1934, shows that the expenditure on the revenue account during the year was £28,047, while the income has amounted to £38,917, leaving a gross profit of £10,870, and a net profit of £2,606 as against £3,801 last year, a decrease of £1,195. The total quantity of gas manufactured during the year has been 222,004,000 c.ft., a decrease of 4,513,000 c.ft. on last year's make. During the year 12,410 tons of coal have been carbonized as against 12,842 tons last year, a decrease of 432 tons. The total quantity of gas delivered this year has been 213,194,850 c.ft., a decrease of 5,300,430 c.ft., or 2·42%. The gas sold per ton of coal carbonized was 17,189 c.ft. against 17,019 c.ft. last year, an increase of 170 c.ft. per ton. The unaccounted-for gas this year was 8,683,150 c.ft., or 3·91%. The net receipts from residuals and bye-products amounted to £6,238 11s. 3d. The make of gas per ton of coal carbonized was 17,889 c.ft., against 17,638 c.ft. last year, an increase of 251 c.ft. per ton.

Morecambe.

The financial statement of the Morecambe and Heysham Corporation Gas Undertaking for the year ended March 31, 1934, stated that the total receipts amounted to £60,834, and the expenditure to £42,399. This left a gross profit for the year of £18,435. This is an increase of £610 over the previous year, and is mainly accounted for by increased sales of gas, residuals, and fittings, less increased cost of manufacture. The loan charges amount to £15,385. Against these charges is an item of £903 interest grant in connection with unemployment relief works, and after making the usual reserve for income-tax, sinking fund, interest on deposits, &c., there is a net profit of £557. It is recommended to transfer to the reserve fund £766, and this compares with the estimated deficit of £500, when the general rate estimates for the year were prepared. On April 1, 1933, the reserve fund showed a credit balance of £1,389. To this must be added the £766 referred to, making a total of £2,155. Payments out of reserve have been made, amounting to £1,441, leaving a balance on March 31, 1934, of £714. The net outstanding debt is £118,682, as compared with £122,203 last year. During the year a site has been secured for prospective new Works, and a Special Order has been obtained authorizing its use for Gas-Works purposes.

Pitlochry.

At the annual meeting of Pitlochry New Gas Light Company, Ltd., held on Aug. 16, it was reported that while the output had been well maintained, there had been a slight drop in revenue, due to a cut of 5d. per 1,000 c.ft. made in the price at last general meeting. A tribute was paid to the work of the Engineer and Manager, Mr. A. McAlpine. A dividend for the year of 7½% was declared.

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CARRON GAS BOILERS.

ILLUSTRATIONS show three popular types of GAS WASH BOILERS especially adapted for MODERN HOUSING REQUIREMENTS.

No. 6N Gas Cooking-appliance Catalogue post free.

"CARRONADE" WASH-HOUSE BOILER.—Outer casing of cast-iron with cast-iron rustless pan. Efficiency burner, combined fume and steam outlet nozzle, complete with wooden lid and draw-off tap.

No. 723. GAS BOILER.—Constructed of strong copper heavily coated inside with pure tin; top, legs, and fume and steam outlet of cast iron; top and fume and steam outlet being galvanised, legs painted aluminium.

No. 718. "FORTH" BOILER.—A cheap, economical, and efficient washing copper. Boiler constructed of copper. Top, hinged lid, base, and legs are of cast iron. Fitted with combined steam outlet and flue.

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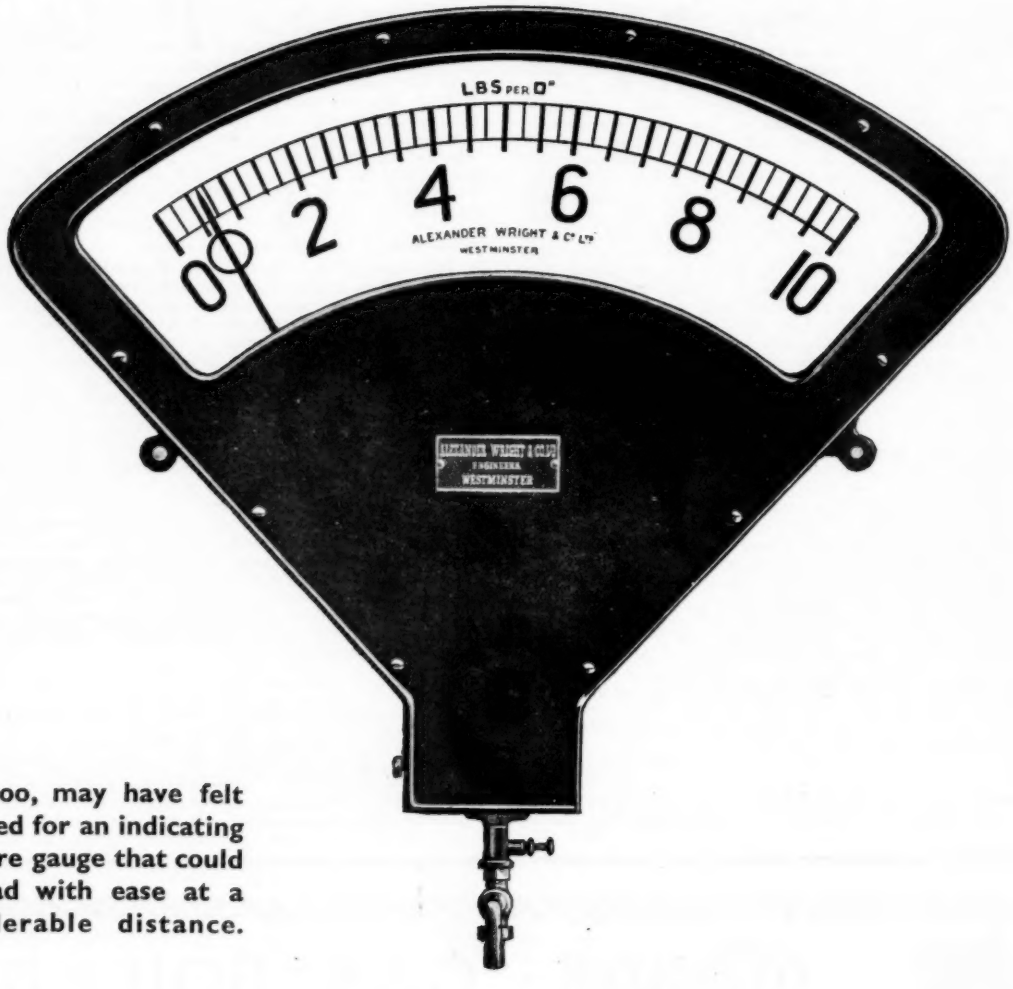

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Simmance Patent Dead-Beat Indicator

The Indicator illustrated is used on gas supplies on a large Steel Works. Similar Indicators can be supplied for various ranges and fitted (if desired) with electric contacts for operation of alarm.

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Gas Markets and Manufactures

Stock Market Report.

[For Stock and Share List, see later page.]

Stock markets last week were on the whole less animated, and the fortnightly account closed in a rather subdued mood. Sellers predominated, and lower prices were established for home rails, leading industrials, oil, rubber, and mining shares. A feature was the large interest in the new issue of Enos, dealings in which commenced on Wednesday at a quick premium. The demand for gilt-edged securities eased somewhat, though the market was steady and any falls were only fractional.

Gas stocks and shares were an exception to the dullness elsewhere, for the volume of business was heavier than for some weeks past, and a large number of issues appreciated substantially. In these days of cheap money and consequent diminution of incomes, investors are constantly on the look out for comparatively "safety-first" holdings to yield just that little bit more to compensate so far as possible for this loss, and the Gas market affords good opportunities in this respect. Prices, however, have been steadily hardening throughout the year, and if this continues a yield of 4% at most on the majority of the leading ordinary stocks will be difficult to obtain in the near future. The feature last week was a sharp rise of 10 points in Hornsey 3½% to 139½, giving a return on a 6% dividend basis of £4 6s.%, which is lower than that obtainable on the ordinary stocks of several other Metropolitan and Suburban undertakings. Increases of note were also recorded by East Surrey with 6 to 134½; Croydon sliding-scale, Imperial Continental, and Northampton 5% maximum, each with a rise of 5 points; while it will be seen in the Stock and Share List that many issues improved from 1 to 4 points.

The Directors of the Uxbridge, Maidenhead, Wycombe, and District Gas Company are offering for sale by tender £20,000 5% preference stock at a minimum of £123 10s.% (yielding £4 1s.%) and £19,000 ordinary stock at a minimum of £158%, yielding £4 8s. 7d. on a dividend of 7%, the rate paid since 1929. Tender forms, which must be sent in by 11 o'clock on Thursday, Oct. 18, may be obtained of Messrs. A. & W. Richards, 37, Walbrook, E.C. 4.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *Oct.* 8.

There are no changes to report in the prices of tar products, which remain as follows:

Pitch, about 55s. per ton f.o.b.

Creosote is firm at 4d. to 4¼d.

Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole, about 2s. 2d.; pure benzole, 1s. 9d. to 1s. 10d.; and 95/160 solvent naphtha about 1s. 7d. The market for all grades of pyridine is quiet, and the 90/160 grade is called about 7s. All prices are per gallon naked at makers' works.

Tar Products in the Provinces.

Oct. 8.

The average prices of gas-works products during the week were: Gas-works tar, 23s. 6d. to 28s. 6d.; Pitch—East Coast, 51s. to 53s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 51s. to 53s. 6d.* Toluole, naked, North, 1s. 6d. to 1s. 8d. Coal-tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5d. Heavy naphtha, North, 9¾d. to 10¾d. Creosote, *ex* works, in bulk, North, liquid and salty, 3⅝d. to 3⅝d.; low gravity, 3⅝d. to 3⅝d.; Scotland, 3¼d. to 3½d. Heavy oils in bulk, North, 3¾d. to 4¼d. Carbolic acid, 60's, 1s. 8d. to 1s. 9d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Oct.* 6.

New business has been scarce during the week but, on the whole, price level is well maintained.

Crude gas-works tar.—Actual value is 32s. to 34s. per ton *ex* works in bulk.

Pitch.—Very little business is yet taking place in this product, but quotations for vertical grade are unchanged at 45s. per ton f.o.b. Glasgow for export, and 42s. 6d. per ton f.o.r. works in bulk for home trade.

Refined tar is unchanged at 3d. to 3¼d. per gallon in buyers' packages at makers' works.

Creosote oil.—Stocks are still low and prices remain steady as follows:—B.E.S.A. Specification, 4d. to 4¼d. per gallon; low gravity, 4¼d. to 4¾d. per gallon; and neutral oil, 4¼d. to 4½d. per gallon; all f.o.r. in bulk.

Cresylic acid.—A fair throughput is being maintained at current prices. Pale, 97/99%, is 1s. 3d. to 1s. 4d. per gallon; dark, 97/99%, 1s. 0½d. to 1s. 1½d. per gallon; and pale, 99/100%, 1s. 4½d. to 1s. 5½d. per gallon; all *ex* works.

Crude naphtha is only available in small quantities at 4½d. to 5d. per gallon, according to quality.

Solvent naphtha.—90/160 grade is on offer at 1s. 3d. to 1s. 4d. per gallon, while 90/190 grade is purely nominal at about 8d. per gallon.

Motor benzole.—1s. 5d. per gallon (nominal).

Pyridines.—90/160 grade is now 6s. 9d. to 7s. 3d. per gallon, and 90/140 grade 7s. to 8s. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	9	to	0	9½	per gallon at works
Motor "	1	3½	"	1	4	" " "
90% "	1	4	"	1	4½	" " "
Pure "	1	7½	"	1	8	" " "

Contracts Advertised To-Day.

Coal.

Dewsbury Gas Department. [p. 170.]

Exhausters.

Blackpool Gas Department. [p. 170.]

Retorts.

Cowes Gas Department. [p. 168.]

Steam Engine.

Blackpool Gas Department. [p. 170.]

New Capital Issues.

Uxbridge Company.—As will be seen from our advertisement columns, Messrs. A. & W. Richards, of 37, Walbrook, E.C. 4, are offering for sale by tender on behalf of the Directors of the Uxbridge, Maidenhead, Wycombe, and District Gas Company, £20,000 of 5% preference stock at a minimum price of issue of £123 10s. per £100, yielding at that price £4 1s.%; and £19,000 of ordinary stock, ranking for a standard dividend of 5%, subject to the sliding scale, equally with existing similar stock now receiving 7%, at a minimum price of issue, £158 per £100, yielding at that price £4 8s. 7d.%.

Trade Notes.

Thos. Cash & Co., Ltd.

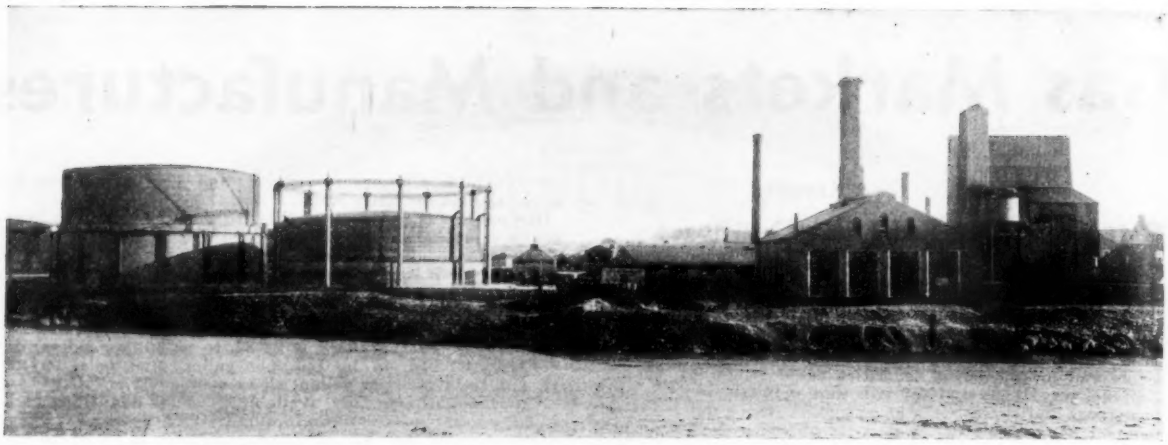
Messrs. Thos. Cash & Co., Ltd., of Birmingham, purveyors of gas coals, announce that their telephone number has been changed to Midland 0467/8.

Bland Lighting Fittings.

From Messrs. Bland Light (1934), Ltd., we have received a copy of their illustrated list of inverted gas burners, indoor and outdoor lamps, brackets, pendants, artistic lighting units, and a wide variety of small brass fittings. Included also in this publication are particulars of the firm's range of gas appliances in the way of rings, irons, fires, water heaters, &c.

Geyser Firm's Centenary.

We have received from Messrs. Ewart & Son, Ltd., of 346, Euston Road, N.W. 1, a copy of their latest list of new pattern instantaneous water heaters, together with their latest list of new multi-point heaters. The firm also announce that on Oct. 22 their showrooms, offices, and works will be closed to give a day's holiday to the staff and workpeople in celebration of their centenary year.



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STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Oct. 5.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Sept. 10	7	7	Alliance & Dublin Ord. ...	132—142	...	139
374,000	"	June 25	4	4	Do. 4 p.c. Deb. ...	90—100	...	...
557,655	"	Aug. 13	7	7	Barnet Ord. 7 p.c.	165—170	...	...
300,000	1	May 7	1 4⅛	1/9	Bombay, Ltd.	27/6—29/6	...	29/3—30/-
178,480	Stk.	Aug. 13	9½	9½	Bournemouth sliding scale	225—230	...	22½ - 229½
550,050	"	"	7	7	Do. 7 p.c. max. ..	168—173	...	171½ - 172
439,160	"	"	6	6	Do. 6 p.c. Pref. ...	142—147	+2	145—146½
50,000	"	June 11	8	8	Do. 3 p.c. Deb. ...	85—90	+2	86
262,025	"	"	4	4	Do. 4 p.c. Deb. ...	105—110	+2	...
335,000	"	"	5	5	Do. 5 p.c. Deb. ...	125—130	+3	...
357,900	"	Aug. 13	7½	7½	Brighton, &c., 6 p.c. Con ...	161—166	...	...
540,000	"	"	6½	6½	Do. 5 p.c. Con ...	152—157	...	155—156
195,500	"	"	6	6	Do. 6 p.c. B. Pref.	142—147	...	144
1,487,500	"	July 9	5	5	Bristol 5 p.c. max.	120½—121½*a*	+1	...
120,420	"	June 11	4	4	Do. 1st 4 p.c. Deb. ...	102—105*a*	...	...
217,870	"	"	4	4	Do. 2nd 4 p.c. Deb. ...	102—105*a*	...	...
328,790	"	"	5	5	Do. 5 p.c. Deb.	121—123*a*	...	...
855,000	"	Sept. 24	8	7	British Ord.	158—163*	...	160½—162
100,000	"	June 11	7	7	Do. 7 p.c. Pref.	154—159	...	...
350,000	"	"	5½	5½	Do. 5½ p.c. Pref.	104—109	...	...
120,000	"	"	4	4	Do. 4 p.c. Red. Deb. ...	98—103	...	101½
450,000	"	"	5	5	Do. 5 p.c. Red. Deb. ...	107—112	...	...
160,000	"	June 11	5	5	Cambridge 5 p.c. Deb. ...	115—120	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	2—4	...	...
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref. ...	4—6	...	...
150,000	Stk.	July 23	4½	4½	Do. 4½ p.c. Deb. ...	90—95	...	...
626,860	"	July 23	6	6	Cardiff Con. Ord.	131—136	+2½	133½—134½
237,860	"	June 11	5	5	Do. 5 p.c. Red. Deb.	107—112	+4	...
157,150	"	July 23	6½	5	Chester 5 p.c. Ord.	113—118*b*	...	...
98,936	1	Sept. 24	2/-	2/-	Colombo, Ltd. Ord.	1⅞—1⅞*	...	...
24,500	1	"	1/4⅜	1/4⅜	Do. 7 p.c. Pref. ...	19/6—21/6*	...	...
609,204	1	Sept. 24	/11'48	/11'48	Colonial Gas Assn. Ltd. Ord.	19/6—21/6*	...	...
296,058	1	"	1/8'30	1/8'30	Do. 8 p.c. Pref.	23/6—25/6*	...	...
1,775,005	Stk.	July 23	6½	5	Commercial Ord.	120 125	...	120½—121½
475,000	"	June 11	3	3	Do. 3 p.c. Deb. ...	83—88	...	86
286,344	"	Aug. 13	5	5	Do. 5 p.c. Deb. ...	122—127	+2	...
807,560	"	Aug. 13	7	7	Croydon sliding scale ...	158—163	+5	157½—162½
569,590	"	"	5	5	Do. max. div.	107—112	...	109
620,385	"	June 25	5	5	Do. 5 p.c. Deb.... ...	123—128	...	...
542,270	"	Aug. 13	10	7	Derby Con.	177—182*c*	...	...
55,000	"	June 25	4	4	Do. 4 p.c. Deb.	97—100*c*	...	...
209,000	"	Aug. 13	5	5	East Hull Ord. 5 p.c. ...	108—112	...	...
181,625	"	Aug. 13	6	6	East Surrey Ord. 5 p.c. ...	132—137	+6	134—135½
175,609	"	June 11	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
1,002,180	"	Sept. 10	†7	†5	European, Ltd.	122—127	...	126
19,343,763	"	Aug. 13	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	26/6—27/ †	...	26/6—26/10½
2,600,000	"	"	3½	3½	Do. 3½ p.c. max.	88—91	+1	89½—90
4,477,106	"	"	4	4	Do. 4 p.c. Con. Pref. ...	105—108	...	106—108
6,102,497	"	May 28	3	3	Do. 3 p.c. Con. Deb. ...	87—90	...	89—89½
2,642,770	"	"	5	5	Do. 5 p.c. Red. Deb. ...	116—119	...	118½—119
2,500,000	"	"	4½	4½	Do. 4½ p.c. Red. Deb. ...	114—117	...	115½—116
270,466	"	Aug. 13	6	6	Harrogate New Cons. ...	127—132	...	...
140,000	1	Sept. 24	1/7½	1/7½	Hongkong & China, Ltd. ...	1⅛—1⅝*	...	...
218,200	Stk.	Aug. 13	6	6	Hornsey Con. 3½ p.c. ...	137—142	+10	130½—140½
5,600,000	"	May 28	10	14	Imperial Continental Cap.	213—218	+5	210½—215
223,180	"	July 23	3½	3½	Do. 3½ p.c. Red. Deb.	92—97	...	...
235,342	"	Aug. 13	8½	8½	Lea Bridge 5 p.c. Ord. ...	165—172	...	...
2,167,410	"	Aug. 13	6	6	Liverpool 5 p.c. Ord. ...	185—186*b*	+½	...
245,500	"	June 11	5	5	Do 5 p.c. Red. Pref. ...	101—111*b*	...	...
806,088	"	July 16	4	4	Do. 4 p.c. Deb. ...	101—103*b*	...	...
11,751	"	Aug. 27	10	8	Maidstone 5 p.c. Cap. ..	180—190	...	...
63,480	"	June 25	3	3	Do. 3 p.c. Deb. ...	75—80	+4	...
75,000	"	May 28	†10	†10	Malta & Mediterranean ... Metropolitan (of Melbourne)	200—210	...	...
332,000	—	Oct. 1	5½	5½	5½ p.c. Red. Deb.	100 -103*	−2	...
221,978	Stk.	Aug. 13	5	5	M. S. Utility "C." Cons. ...	111—116	...	...
818,557	"	"	4	4	Do. 4 p.c. Cons. Pref.	97—102	...	99½—100½
360,075	"	June 11	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
148,955	"	"	5	†5	Do. 5 p.c. Deb. ...	119—124	...	...
125,000	—	July 9	....	11/8	Do 3½ p.c. Rd. Rg. Bds.	97—100	...	...
675,000	"	May 28	†6	†13	Montevideo, Ltd.	60—65	...	62
2,061,315	"	Aug. 13	6⅔	6	Newcastle & Gateshead Con.	25/6—26/9*d*/	+/6	...
682,886	"	"	4	4	Do. 4 p.c. Pref. ...	103—105*d*	+1	...
776,706	"	June 11	3½	3½	Do. 3½ p.c. Deb. ...	92½—93½*d*	...	...
277,285	"	May 7	5	5	Do. 5 p.c. Deb. '43 ...	105—107*d*	...	...
274,000	"	Aug. 13	5	5	Newport (Mon.) 5 p.c. max.	105—107*a*	...	...
204,940	"	Aug. 13	7½	7½	North Middlesex 6 p.c. Con.	155—160	+2	...
393,160	"	Aug. 13	5	5	Northampton 5 p.c. max. ...	107—112	+5	107—111
800,000	"	May 7	†9	†7	Oriental, Ltd.	168—173	+1	170—174
416,617	"	June 11	8	8	Plym'th & Stonehouse 5 p.c.	178—183	...	...
504,416	"	Aug. 13	9	9	Portsm'th Con. Stk. 4 p.c. Std	177—182	...	181½
241,446	"	"	5	5	Do. 5 p.c. max. ...	105—110	...	...
114,000	"	July 23	5	5	Preston 5 p.c. Pref. ...	101—106	...	...
1,796,968	Stk.	Aug. 27	6	6	Sheffield Cons.	138—140*c*	...	...
95,000	"	July 9	4	4	Do. 4 p.c. Deb.	100—104*c*	...	...
133,201	"	Aug. 13	5	8½	Shrewsbury 5 p.c. Ord. ...	137—142	...	...
90,000	10	May 28	†4	†3	South African	2—4	...	...
927,177	1	Sep. 10	1/22	1/22	South East'n Gas Cn. Ld Ord	28/-—30/-	+/6	28/7½—29/10½
786,061	1	"	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref	22/-—23/-	+/3	22/9
450,000	Stk.	Aug. 13	74/4	4	Do. 4 p.c. Red. Deb. ...	101— 103	...	...
6,709,895	"	Aug. 13	7	5	South Met. Ord.	138—141	+1	138—141
1,135,812	"	"	6	6	Do. 6 p.c. Irred. Pf.	142—147	...	146¾
850,000	"	"	4	4	Do. 4 p.c. Irred. Pf.	104—107	...	...
1,895,445	"	June 25	3	3	Do. 3 p.c. Deb ...	87—90	...	89 - 90
1 000,000	"	July 9	5	5	Do. 5 p.c. Red. Deb.	116—118	...	117¾
209,820	"	Aug. 13	8½	8½	South Shields Con.	169—171*d*	...	...
1,543,795	"	July 9	6	6	South Suburban Ord. 5 p.c.	133—136	...	134—136
512,825	"	"	5	5	Do. 5 p.c. Pref.	120—125	...	...
300,000	"	"	4	4	Do. 4 p.c. Pref.	101—106	...	104
868,837	"	June 11	5	5	Do. 5 p.c. Deb.	121—126	...	125½
100,000	"	"	4	4	Do. 4 p.c. Deb.	102—107	...	...
647,740	"	Aug. 13	5	5	Southampt'n Ord. 5 p.c. max.	112—117	...	...
121,275	"	June 11	4	4	Do. 4 p.c. Deb.	99—104	...	...
350,000	"	Aug. 13	5½	5½	Swansea 5½ p.c. Red. Pref.	107 - 112	...	...
200,000	"	June 11	6½	6½	Do. 6½ p.c. Red. Deb.	102—107	...	...
1,076,490	"	Aug. 13	8½	8½	Tottenham and District Ord.	153—158	...	...
409,885	"	"	5½	5½	Do. 5½ p.c. Pref. ...	130—135	...	...
62,235	"	"	5	5	Do. 5 p.c. Pref. ...	118 - 123	...	...
199,005	"	June 11	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
349,110	"	Aug 13	7	7	Uxbridge, &c., 5 p.c. ...	153 - 158	...	...
88,330	"	"	5	5	Do. 5 p.c. Pref. ...	115—120	...	...
1,326,700	"	Aug. 13	7	7	Wandsworth Consolidated	158—163	...	161—162½
1,371,378	"	"	5	5	Do. 5 p.c. Pref.	121—126	+1	124¾—125½
1,317,964	"	June 11	5	5	Do. 5 p.c. Deb.	124—128	+2	125¾—126¾
209,300	"	"	...	26/8	Do. 4 p.c. Deb.	104—107	...	...
158,400	"	Aug 13	6*g*	5	Winchester W. & G. 5 p.c. Con.	115—120	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock *g.*—Paid £3, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year.

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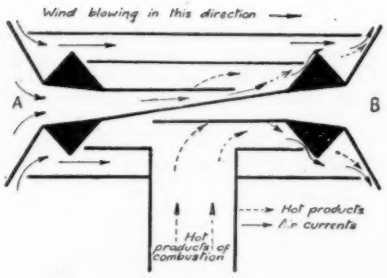

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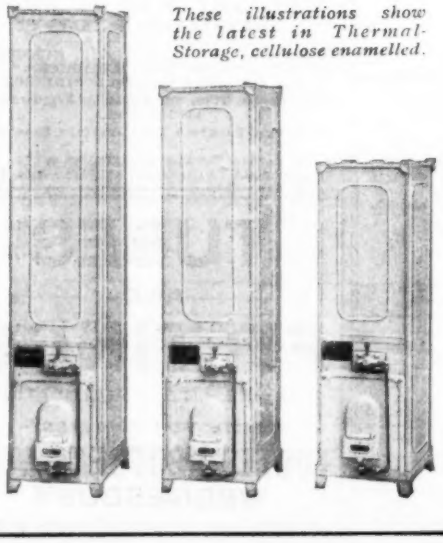

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